

**NEWFOUNDLAND AND LABRADOR
SUSTAINABLE FOREST MANAGEMENT
STRATEGY**

**DRAFT
May/ 2003**

EXECUTIVE SUMMARY

The people of the Newfoundland and Labrador have always maintained a close association with our forests. Thousands of years ago, aboriginal people used forests as a source of food, shelter, heat and medicines. European settlers quickly developed similar association with forests for subsistence purposes, such as fuelwood, lumber and shelter. Today, the province's forests continue to play a significant role in both the economic and social well-being of Newfoundlanders and Labradorians.

The province is comprised of forests, wetlands, barrens and water. The total landmass of Newfoundland is 11.1 million hectares, of which 5 million is forested. Labrador's landmass is approximately 29.3 million hectares with 18 million forested.

Approaches to managing forests have evolved through time. The early 1900's was a time of forest industry development, where forests were exploited. During the past 100 years, forest management has evolved from forest protection, to timber management, to multiple use management, and today sustainable forest management (SFM). Ecological, economic, and social parameters form the foundation of SFM. The Newfoundland Forest Service of the Department of Forest Resources and Agrifoods defines SFM as "to maintain the long term health of forest ecosystems, while providing ecological, economic and cultural opportunities for the benefit of present and future generations".

Managing forest ecosystems requires knowing where you are headed, and how you plan to get there. This Provincial Sustainable Forest Management Strategy introduces a new vision for the province's forest ecosystems. This vision includes finding a balance between

environmental, economic and social values, while having forest ecosystems that provide viable populations of native species, a sustainable forest economy and associated employment.

The *Forestry Act* 1990 mandates the Newfoundland Forest Service to manage the forest resources of the province. Forest management occurs on a district basis through 18 districts in Newfoundland and six in Labrador. A management plan is required for each district comprising a management plan report, five-year operating plan and an annual plan.

The *Forestry Act* also requires that a wood supply analysis be completed every five years. Chapter 3 of this strategy details the latest analysis, which established the following annual allowable cuts for the next five year period:

Newfoundland (softwoods)	2,004,800 m ³ /year
Labrador (softwoods)	325,000 m ³ /year
Total (softwoods)	2,329,800 m ³ /year
Newfoundland (hardwoods)	128,800 m ³ /year

The analysis was completed in 2001. Three data sources were needed to conduct this analysis:

1. A description of the current state of the forest.
2. Growth and yield rates associated with the current forest.
3. Management strategies applied to the forests.

Developing these data sources required careful and detailed consideration of a broad range of both timber and non-timber values.

In the new Provincial Sustainable Forest Management Strategy four strategic directions have been established to provide focus and actions that support the vision. The four directions are: ecologically-based forest management, economic considerations, social considerations and Labrador. The ecological, economic and social directions have been structured for consistency with the Canadian Council of Forest Ministers (CCFM) Six Criteria of Sustainable Forest

Management. These criteria define broad SFM values that have been accepted across Canada. For each criteria, this Strategy establishes provincial values, goals for the values, actions to be implemented to achieving the goals and indicators to measure progress .

The fourth strategic direction addresses issues specific to Labrador. Aboriginal participation in management planning, management tools, information and infrastructure, economic opportunities and the opening of the Trans-Labrador highway will offer unique challenges in developing the forest resources. This Strategy will build on the relationships developed to date with aboriginal people.

This Provincial Strategy underwent two independent audits. The first reviewed the technical soundness of the wood supply analysis, while the second review focused on the strategies compatibility with national commitments, other provincial jurisdictions and the management direction being consistent with approaches across the country.

This new Provincial Sustainable Forest Management Strategy sets a new vision and direction for managing the forest ecosystem of the province. Implementation of the Strategy will ensure the integrity of our forests is maintained while sustaining economic prosperity for the people of the province.

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INTRODUCTION

Living and working in the forest have been a way of life for people in Newfoundland and Labrador for hundreds of years. Newfoundlanders and Labradorians enjoy a wide array of forest related activities, including harvesting timber for domestic and commercial purposes and using forest ecosystems for a variety of recreational opportunities that range from fishing and hunting to boating, hiking, camping and berry-picking. The rural lifestyle of our province provides a distinctive situation where consumptive and non-consumptive uses of forests are historically intertwined. The intimate use of our land and resources has shaped who we are as a people.

Forest values vary tremendously, and at times, conflict among citizens of the province. Forest managers are being challenged more than ever to find a sustainable balance of these values that underlie decisions related to managing our forests.

Traditionally, forest managers have approached management by seeking to optimize timber production and protect forests from insects, diseases and fire. Today, however, forest managers must take a leadership role in sustainable forest management by finding a balance between the ecological, economic and social values that the public defines. In seeking this balance, key priorities are to sustain and conserve the forest ecosystems, to apply stewardship principles and to address the consequences of social and economic demands on our resources.

References to the latest and best form of forest management keep changing, examples are sustainable forest management, sustainable forestry, ecosystem-based forest management and ecosystem management. For the purposes of this document, these concepts are considered the

same, as they all essentially point to assessing ecological, social and economic priorities in sustainable forest management. The Newfoundland Forest Service (NFS) adopts the Canadian Standards Association (1996) definition for sustainable forest management:

“to maintain the long-term health of forest ecosystems while providing ecological, economic and cultural opportunities for the benefit of present and future generations.”

In reality, SFM is an exercise in making decisions when not all the information is available. The complexity of ecosystems, economic conditions and societal values will always limit our knowledge and understanding. Consequently, SFM is like an experiment. Managers make predictions about future forest conditions based on peoples values, technical knowledge and proposed management actions. These predictions are coupled with a monitoring program. Therefore, for SFM to be successful, it must be viewed as a continuous and ongoing learning process rather than an end in itself. This process is referred to as adaptive management, which is a key component of sustainable forest management.

Adaptive management is a framework for managing with limited information, and for obtaining new information while managing. Therefore, the application of adaptive management to SFM in this province is logical because forest ecosystems are being managed under conditions where not all inter-relationships and interactions among forest values and management strategies are known. Adaptive management provides a structured framework for learning about these relationships. To be successful, SFM must be designed to acquire new information about the forests being managed and to provide a systematic and sound methodology to incorporate the new information into future management.

The Newfoundland Forest Service prepared and implemented an adaptive management

planning process based on the document *Environmental Preview Report: A Proposed Adaptive Management Process*. This process has three objectives:

1. Establish a proactive planning framework to include stakeholders.
2. Learn more about forest ecosystems while they are being actively managed.
3. Attain the goal of sustaining ecosystem integrity and health over the long term through an ecosystem approach to forest management, which integrates the scientific knowledge of ecological relationships and the biological limits of growth with social values.

This new Provincial Sustainable Forest Management Strategy builds on the previous Twenty Year Forestry Development Plan (1996-2015). During the five-year period 1996-2001, significant progress was made in SFM. Examples of this progress are:

1. Public and stakeholder consultations for preparing district forest management plans have occurred in most districts. Local Planning Teams were established for most management districts who participated in the preparation of strategy documents and five-year operating plans. While successful, changes to improve the process will occur in the next five years.
2. Partnerships now exist with municipalities, national parks, forest-based industries, federal and provincial government departments, aboriginal groups, and non-government organizations. These partnerships have expanded and enhanced understanding of values associated with forest ecosystems in the province, leading to improved district forest management plans.
3. In 2001, the Government of Newfoundland and Labrador and the Innu Nation signed a *Forest Process Agreement* for the development of sustainable forestry in District 19. The agreement allowed for both Innu community consultations and general public sessions to

provide advice, which helped form a unique strategy for this district.

Recently, the Department of Forest Resources and Agrifoods also entered into a Memorandum of Understanding with the Labrador Metis Nation that enables Metis Nation to have input into forest management in Labrador.

4. Planning Teams have worked to incorporate non-timber values into district plans and on-the-ground actions. For example, the Inland Fish and Wildlife Division of the Department of Tourism, Culture and Recreation reviews all the five-year operating plans, ensuring acceptable habitat for all wildlife and habitat protection for pine marten where populations of this endangered species exist. Strict measures are undertaken when forest management activities occur within community protected water supplies.

Archaeological surveys are now conducted where potential exists for archaeological artifacts. Consultations have occurred with owners of outfitting establishments to mitigate the impact of forest management activities on their businesses. These consultations have been productive and they will continue.

5. Forest inventories were expanded to include non-timber information because SFM requires an inventory beyond a description of timber. Today's Provincial Forest Inventory includes songbird surveys, measurement of all dead and dying trees in permanent sample plots, identification of indicator plants of ecosystem productivity, soil profiles and chemical analyses, and records of wildlife use. Within many districts, forest values have been mapped and are being used by management Planning Teams.
6. The provincial silviculture program saw the planting of 18,762 hectares (ha) and the thinning of 32,114 ha of regenerating forest. These represents 70% of the figures targeted

in the 1996-2001 provincial plan.

7. During the period 1997-2001, there was a seven per cent undercut of the Island's AAC, while Labrador only cut 10 per cent of its total AAC.
8. A total of 799 km of new forest access road was constructed in the province and 8 km of roads were decommissioned. An access road construction manual was developed to ensure environmentally friendly techniques were used.
9. Expansion has occurred in the province's sawmill and value-added industries. Sawmill production increased from 92 million board feet (MMfbm) to 144 MMfbm in the past five years. The number of value-added companies increased to 78, with 20 of these companies using local lumber.
10. Managers have introduced a wood supply analysis where areas to harvest timber can be identified on maps. This analysis included a new ecological objective that a portion of the older forest in each district (15 - 20%) is not permitted to be harvested. Additionally, areas proposed for ecological protection by the Department of Tourism, Culture and Recreation were withdrawn from all wood supply calculations and are exempt from timber harvesting.
11. Research has been initiated to improve decision-making for SFM. Priority has been assigned to ongoing research in determining the natural disturbance regime for insects in western Newfoundland, evaluating the use of corridors by wildlife, monitoring buffer zones around water, understanding differences in biodiversity between burnt and cut forests in Labrador, and studying the watershed in the Triton Brook area of central Newfoundland.

A complete description of activities over the past five years is found in Appendix 1.

This new Provincial Sustainable Forest Management Strategy builds on the successes of past accomplishments. The Strategy allows the Province to continue moving forward in the prudent management of forest ecosystems by setting a framework of values, goals, indicators and actions for sustainable forest management for the next five years.

CHAPTER 1: MOVING FORWARD

Vision Statement

The Newfoundland Forest Service (NFS) has adopted the following vision of the forests for Newfoundland and Labrador:

The forests of Newfoundland and Labrador will maintain a sustainable balance of environmental, economic and cultural values desired by society. They will provide for viable populations of native species, sustainable yields of forest products and the creation of wealth and employment to support local, regional and provincial economies.

Mission Statement

Achieving this vision is best done by acting on a mission statement. Our mission statement is:

To manage, conserve, enhance and use the forest ecosystems of Newfoundland and Labrador using adaptive management to ensure its sustainability and productivity with the appropriate balance of values desired by society.

Guiding Principles

The Newfoundland Forest Service's vision describes the long term contribution of our forests to the well being of our citizens. The Provincial Sustainable Forest Management Strategy sets the direction for moving towards the vision through implementing the SFM philosophy. This Strategy defines these forest values and discusses their viability and sustainability within the context of SFM. The Newfoundland Forest Service has adopted six guiding principles to support its vision and mission statements and will serve as the foundation for SFM in the province:

- ▶ Forest ecosystems are managed to maintain their ecological integrity, productive capacity, resiliency, and biodiversity.

- ▶ Management practices are to respect all forest land use and forest values.
- ▶ Partnerships will be fostered to provide meaningful participation in SFM.
- ▶ Economic benefits from the forest resource will be maximized.
- ▶ Adaptive management principles are to be applied in the management of forest ecosystems.
- ▶ Conservation and compliance that ensures the protection of wildlife and forest ecosystems.

Legislation and Planning Framework

The *Forestry Act* mandates the Newfoundland Forest Service to manage our province's forests. This mandate goes beyond timber or wood values because the *Forestry Act* defines sustained yield forest management as "a policy, method or plan of management to provide for an optimum continuous supply of timber in a manner consistent with other resource management objectives, sound environmental practices and the principle of sustainable development." This changes the focus from managing only trees to managing our overall forest ecosystem in consideration of these values. Also, the *Forestry Act* states that the Minister of Forest Resources and Agrifoods will consult with other resource departments and the people of the province who may be directly affected by SFM.

The Newfoundland Forest Service is required to ensure that a sustainable forest management plan is prepared for each district (figure 1). The process for preparing district plans involves intensive public participation through Planning Teams. The Provincial Strategy has traditionally involved consultations with government resource managers and requested public consultations after the Strategy is approved in principle by the Lieutenant-Governor-in-Council.

The current framework for managing the province's forest ecosystems includes a number of planning documents as outlined below:

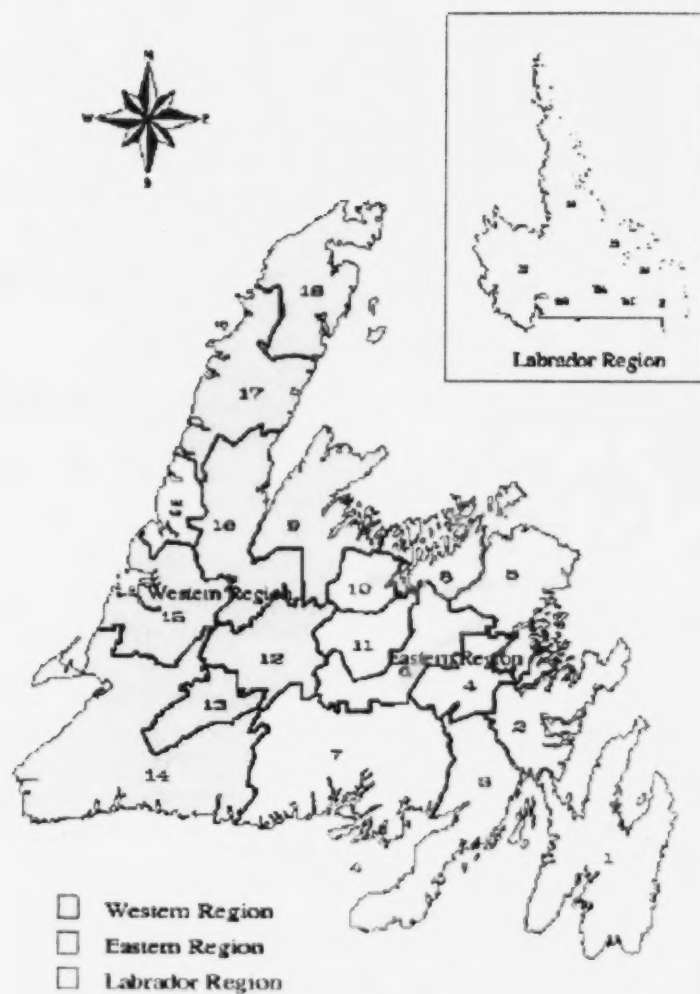


Figure 1. Forest Management Districts of Newfoundlnd & Labrador

- ▶ **Provincial Sustainable Forest Management Strategy:** This document will set out the nature and extent of the forest resources of the province, including the results of the most recent wood resource analysis. It will identify goals and objectives of forest management and the actions to achieve these goals, as well as provide a brief description of the relationship between the provincial goals, objectives and strategies to each district SFM plan. The Provincial Strategy will provide overall direction to the district Planning Teams.
- ▶ **District Management Plan Report:** This report describes the nature and extent of the forest resources within the district. It will include the challenges associated with achieving a regulated forest and the general policies and practices to be employed in the long term.
- ▶ **Five-Year Operating Plan:** This plan identifies the areas to be harvested, the location and types of silvicultural treatments to be applied, as well as the location of primary forest access roads to be constructed during the period covered by the plan.
- ▶ **Annual Operating Plan:** An annual operating plan includes a description of the management area, explanations of tenure arrangements that may impact forestry activities proposed, a detailed description of all proposed forestry activities, and site specific measures designed to mitigate concerns raised during the public consultations.
- ▶ **Past Annual Report:** This report details information on activities that occurred over the past year regarding on-the-ground actions versus what was proposed in the annual operating plan.

The Newfoundland Forest Service is currently reviewing this framework with the goal of

streamlining the current planning process.

The Department of Forest Resources and Agrifoods fulfills its mandate through an organizational structure which includes headquarters and regional branches. The headquarters of the Forestry Branch is comprised of five divisions, with four of them located in Corner Brook (Forest Ecosystem Management, Forest Engineering and Industry Services, Ecosystem Health, and Compliance and Legislation). The fifth division, Policy and Coordination, is located in St. John's. Headquarters provides policy and provincial direction for managing our province's forest. (organizational structure is in Appendix 2). There are three regional divisions - East, West and Labrador. They are responsible for implementing the legislation and policy of the province. The actual on-the-ground implementation of SFM plans occurs at the local level (regional organization is in Appendix 3). Executive support is provided by the Deputy Minister of Forest Resources and Agrifoods and the Associate Deputy Minister of the Forestry Branch. The administrative support is provided by the Human Resources and Financial Operations Divisions.

While the *Forestry Act* directly influences how the forests of Newfoundland and Labrador are managed, seven other documents significantly influence forest management in the province:

- ▶ Provincial Environmental Protection Act 2002: This Act requires that all five-year operating plans be registered for assessment of their impact on the environment. Plans must be released by the Minister of Environment.
- ▶ Environmental Preview Report (1995): The Environmental Preview Report (EPR) was prepared through the environmental assessment process and requires Planning Teams to be central in providing assistance to the district manager in preparing the SFM plan for

the district. The composition of the team is established through an open invitation to the federal, provincial, and municipal governments by direct letter and to organizations and the general public through a public notice.

- ▶ Canada Forest Accord: This Accord is the mechanism for implementing the National Forest Strategy in the province. This strategy provides national direction in forest management across Canada.
- ▶ Canadian Biodiversity Strategy: The Canadian Biodiversity Strategy provides a framework for action to ensure that the productivity, diversity and integrity of our natural systems will be maintained or enhanced. It promotes the conservation of biodiversity and the sustainable use of our biological resources.
- ▶ Criteria and Indicators of Sustainable Forest Management: The Canadian Council of Forest Ministers have established criteria and indicators defining SFM in Canada, which are intended to provide a common understanding of what is meant by sustainable forest management. They identify the key ecological, social and economic values that comprise sustainable forest management. The province has committed to report on these indicators at national and provincial levels.
- ▶ Guidelines for the Preparation of Forest Ecosystem Management Plans: These guidelines address the minimum requirements that a plan must meet. Additional information will be determined during Planning Team sessions and will reflect the unique characteristics of each management district.
- ▶ Environmental Protection Guidelines for Ecologically-Based Forest Management: These guidelines define operational conditions to be implemented to protect the environment

and non-timber values.

There are institutional challenges in implementing a Provincial Strategy and district forest management plans. The implementation of SFM requires involvement, cooperation and participation of many different disciplines, such as fish and wildlife, archaeology, parks and protected areas, recreation, tourism, outfitting industry, soils, water quality and quantity and forest hydrology. Most jurisdictions have a Ministry of Natural Resources where many, if not all, the disciplines are in one department. In this province these disciplines are located in different departments which requires strong communication and cooperation between the various departments.

Measuring Progress Towards Sustainable Forest Management

To properly manage a forest, all resource values that may be influenced by forest management actions need to be identified. The Canadian Council of Forest Ministers (CCFM) endorsed science-based criteria and indicators to help identify values and measure progress in sustainable forest management. The Department has adopted the CCFM criteria and has established provincial values, goals, and indicators to measure progress towards SFM. These values are described in Appendix 4. The Department of Forest Resources and Agrifoods will report to the people of Newfoundland and Labrador on the progress made in this Provincial Strategy in achieving sustainable forest management. The six CCFM criteria and associated provincial values are:

- **Criterion 1: Conservation of Biological Diversity**

Provincial Values:

- Representative landscapes: i.e protecting forest ecosystems

- Special places: i.e. protecting white and red pine stands

- Maintaining wildlife habitat

- ▶ **Criterion 2: Maintaining Healthy Forests**

Provincial Values:

- Natural ecological processes will be maintained

- Environmental integrity

- Natural productive capacity: i.e no loss of tree growth

- ▶ **Criterion 3: Conservation of Soil and Water Resources**

Provincial Values:

- Water

- Soil

- Policy and protection of forest soils and water

- ▶ **Criterion 4: Forest Ecosystem Contributions to Global Ecological Cycles**

Provincial Values:

- Forest as carbon sinks: i.e. measuring the amount of carbon in our forests

- Forest land conservation

- ▶ **Criterion 5: Multiple Benefits to Society**

Provincial Values:

- Commercial timber

- Employment

- Revenue from timber and non-timber forest products and services

- Recreation

- Forest products and personal use

- ▶ **Criterion 6: Accepting Society's Responsibility for Sustainable Development**

Provincial Values:

- Aboriginal perspectives and involvement

- Forest contribution to community sustainability

- Fair decision-making

- Informed and responsible decision-making.

Measuring the indicators of this criteria and indicator framework will be a real challenge as it will require further technical capabilities and funding. Data collection for ecologically-based indicators will occur mainly through the Newfoundland Forest Service inventory. As well, a new National Forest Inventory (NFI) program will be tested in the province over the next five years. The National Inventory, which is a method for collecting data, has the potential to report on ecological indicators at the provincial and national levels.

New Initiatives

The Provincial Sustainable Forest Management Strategy introduce's new initiatives to enhance our understanding and management of forest ecosystems. These are identified below and will be described in more detail later in the document:

- ▶ Managing for biodiversity by applying a more ecological approach to forest management.
- ▶ A new forest management planning framework and planning guidelines will be introduced, reflecting the experiences of past years.
- ▶ Computer models are an integral tool in today's management of forest ecosystems. This

Strategy lays out the current forest modeling capabilities, identifies future modeling needs and sets a direction for the future.

- ▶ The current legislative framework for managing forest ecosystems will be reviewed.
- ▶ Significant progress has been made on establishing a value-added forest industry in the province. This Strategy builds on current success to expand this industry.
- ▶ Non-timber forests products has become a significant forest industry in many jurisdictions. The industry in Canada is valued at \$500 million. The province proposes to initiate the development of a non-timber forest product industry.
- ▶ Society is demanding that forests be managed on an ecological and sustainable basis. Third party audits for compliance with a management standard have become an acceptable mechanism to determine the sustainability of forest management in a defined area. Our province's pulp and paper industry has developed environmental management systems meeting the International Standards Organizations (ISO) 14001 standard. The Newfoundland Forest Service is also committed to continue working towards meeting the ISO 14001 EMS standard on Crown land during the next five years of this Strategy.
- ▶ As highlighted previously, the province introduced local stakeholder participation in preparing district sustainable forest management plans. This Strategy outlines improvements in the public consultation process.
- ▶ Labrador's forest resource will be further developed during the next five years. Participation with aboriginal groups and other stakeholders in the region will be key to this development.

CHAPTER 2: PROVINCIAL SCOPE

Ecoregions and Forest Types

Ecological classification is an important tool in achieving the sustainability of our province's forest resources, because it provides a framework for ecological understanding. In Newfoundland and Labrador, forest ecosystem classification has two levels: ecoregions and forest types. An ecoregion has a distinctive pattern of recurring vegetation and soil development, controlled by regional climate. Within ecoregions, forest types represent local variations in soil moisture and nutrients due to changes in topography. These differences are reflected in the vegetation which distinguishes forest types.

Over the past 30 years, the Canadian Forest Service and the Newfoundland Forest Service have developed several descriptions of forest ecological classification (Damman 1963; 1964; 1967; 1983; Meades 1986; 1989; Meades and Moores 1989). Insular Newfoundland has nine ecoregions, encompassing 18 subregions (figure 2), while there are 10 ecoregions in Labrador (figure 3). Descriptions of these ecoregions appear in Appendix 5.

Forest Description

The ecoregions of the province collectively form the most easterly part of the Boreal Shield Ecozone. A cool, moist climate following glaciation typifies the ecozone, creating poorly-drained, podzolic soils and slow rates of nutrient cycling. Also typical for this ecozone, trees are relatively small, consisting of mainly coniferous species, intermixed with hardwood species. There are 21 tree species native to Newfoundland and Labrador.

Black spruce (*Picea mariana* [Mill.] B.S.P.) is dominant in about one third of the forests on the island and two thirds of Labrador's forests. It is also the official tree of Newfoundland

Ecoregions of Newfoundland

Ecoregions & Subregions (Dainman 1983)

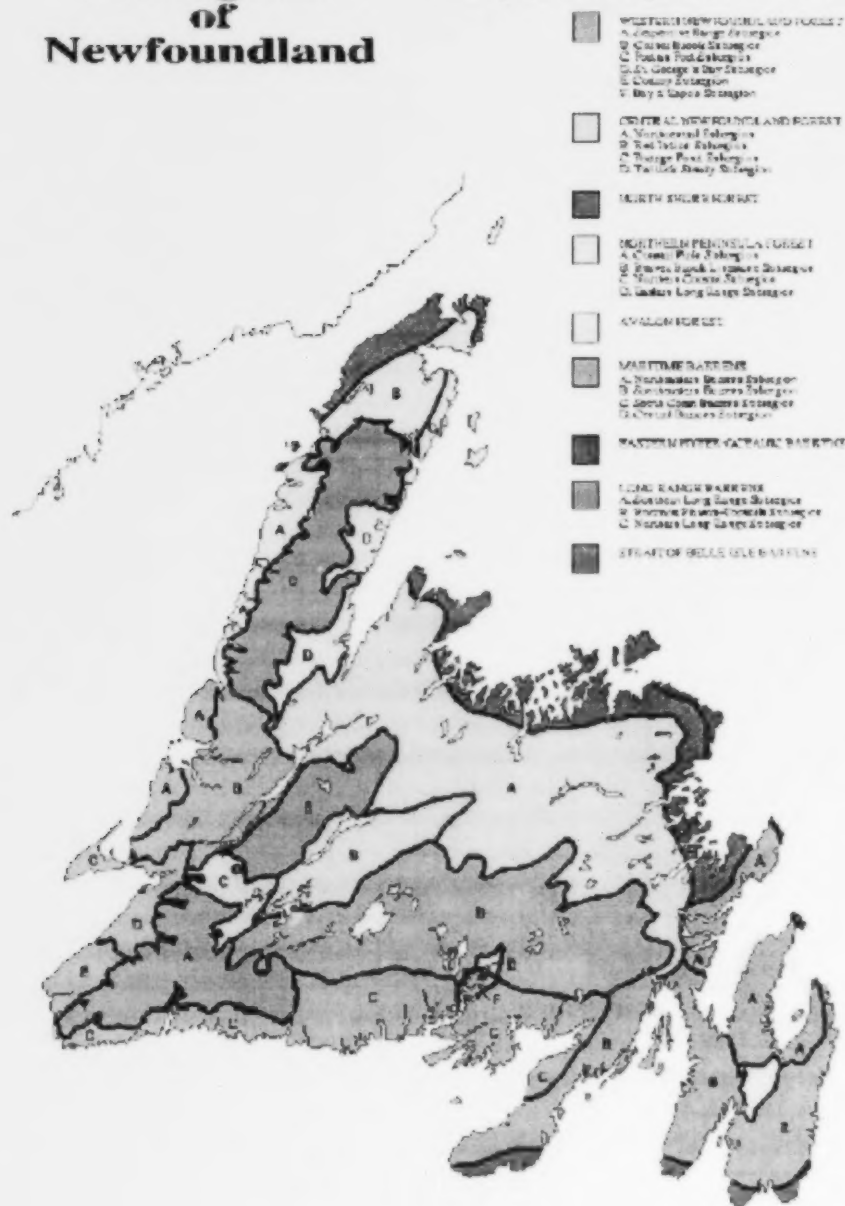


Figure 2. Map defining the ecoregions of Newfoundland.

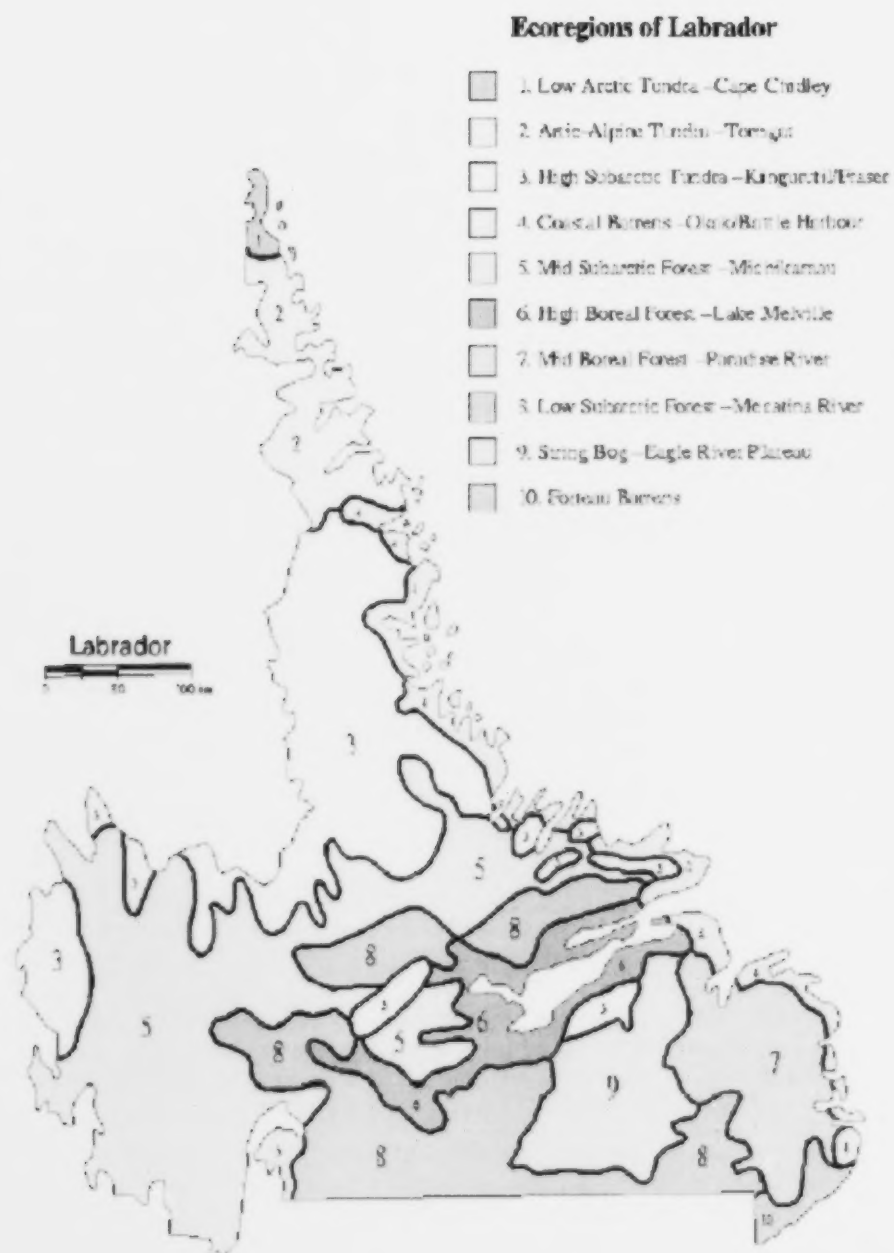


Figure 3. Map defining the ecoregions of Labrador.

and Labrador. Due to its very high tolerance for unfavourable conditions, black spruce is common both on very wet and dry sites. It grows well on fertile sites, but is a poor competitor among faster growing hardwoods. Repeated fires in past centuries have established black spruce as a dominant species across much of central Newfoundland. Where sites are more favourable, white spruce (*Picea glauca* [Moench] Voss) may be more prevalent.

In Labrador, the combination of modified climate and fine texture soils of the lowland areas allow black spruce to develop extensive stands in association with balsam fir (*Abies balsamea* [L.] Mill.), white birch (*Betula papyrifera* Marsh.), balsam poplar (*Populus balsamifera* L.), and trembling aspen (*Populus tremuloides* Michx.). These sites are also especially favourable to the growth of white spruce. On upland slopes and poorly drained flats, black spruce occurs alone or mixed with balsam fir and white birch. Elsewhere in Labrador, sites are limited by poor drainage, adverse climate and thin, nutrient poor, sandy soils. These areas are characterized by subarctic forests of pure black spruce and mixtures of black spruce and balsam fir.

Balsam fir is the most abundant tree on the island and the second most abundant in Labrador. The forests of western Newfoundland are commonly pure balsam fir stands which prefer moist, well-drained soils and which can attain heights of up 24 metres at 100 years on the best sites. Hardwoods have not formed major forest stands in this province; however, white birch and trembling aspen are significant components of mixed wood and hardwood stands on better forest sites throughout the island, especially the deep river valleys of the western Long Range Mountains and the Humber and Red Indian Lake watersheds. Hardwoods may reach a height of 22 metres at 80 years of age on the most fertile sites.

The other native trees in this province include tamarack or juniper (*Larix laricina* [Du

Roi] K. Koch), white pine (*Pinus strobus* L.), red pine (*Pinus resinosa* Ait.), red maple (*Acer rubrum* L.), yellow birch (*Betula alleghaniensis* Brit.), mountain white birch (*Betula cordifolia* Regel), mountain maple (*Acer spicatum* Lam.), pin cherry (*Prunus pensylvanica* Lf.), black ash (*Fraxinus nigra* Marsh), american mountain ash (*Sorbus americana* Marsh), showy mountain ash (*Sorbus decora* [Sarg.] Schneid), jack pine (*Pinus banksiana* Lamb.), choke cherry (*Prunus virginiana* L.), speckled alder (*Alnus rugosa* [Du Roi] Spreng.), and mountain alder (*Alnus crispa* (Ait.) Pursh). The only natural jack pine stand in the province is found in western Labrador.

The total area of Newfoundland is 11.1 million hectares (ha). The Provincial Forest Inventory has determined that approximately 5.2 million ha (46%) in Newfoundland is forested (Table 1). The area of timber land currently supports a gross merchantable softwood volume of 164,345,000 cubic metres (m³) with an additional standing volume of 21,499,000 m³ in hardwood species.

Of the productive timber land on the island, 1.77 million ha (59%) has been tenured to the province's two pulp and paper companies, Corner Brook Pulp and Paper Ltd. (32.7%) and Abitibi-Consolidated Company of Canada Inc. (25.7%) (Table 2). Company tenure is maintained through a mixture of freehold (2%), leased (4%) and licensed (52%) land (figure 4). Unalienated Crown land in the province accounts for 1.18 million ha (39%), and the remaining (2.6%) is in national parks, reserves, and small private holdings. Generally, the pulp and paper companies manage the more productive interior forest lands, while unalienated Crown land, the exclusive responsibility of Government, is concentrated in the less productive coastal regions where more domestic cutting also occurs.

The total area of Labrador is approximately 29 million ha, with 18 million ha of forested

land and 5.5 million ha consisting of productive forest. The gross merchantable timber volume in Labrador is 180,000,000 m³. The productive forests of Labrador are mainly found in the valleys of the Churchill, Kenamu, Eagle, Hawke, Alexis and Kaipokok Rivers.

Table 1. Land Classification of Newfoundland and Labrador

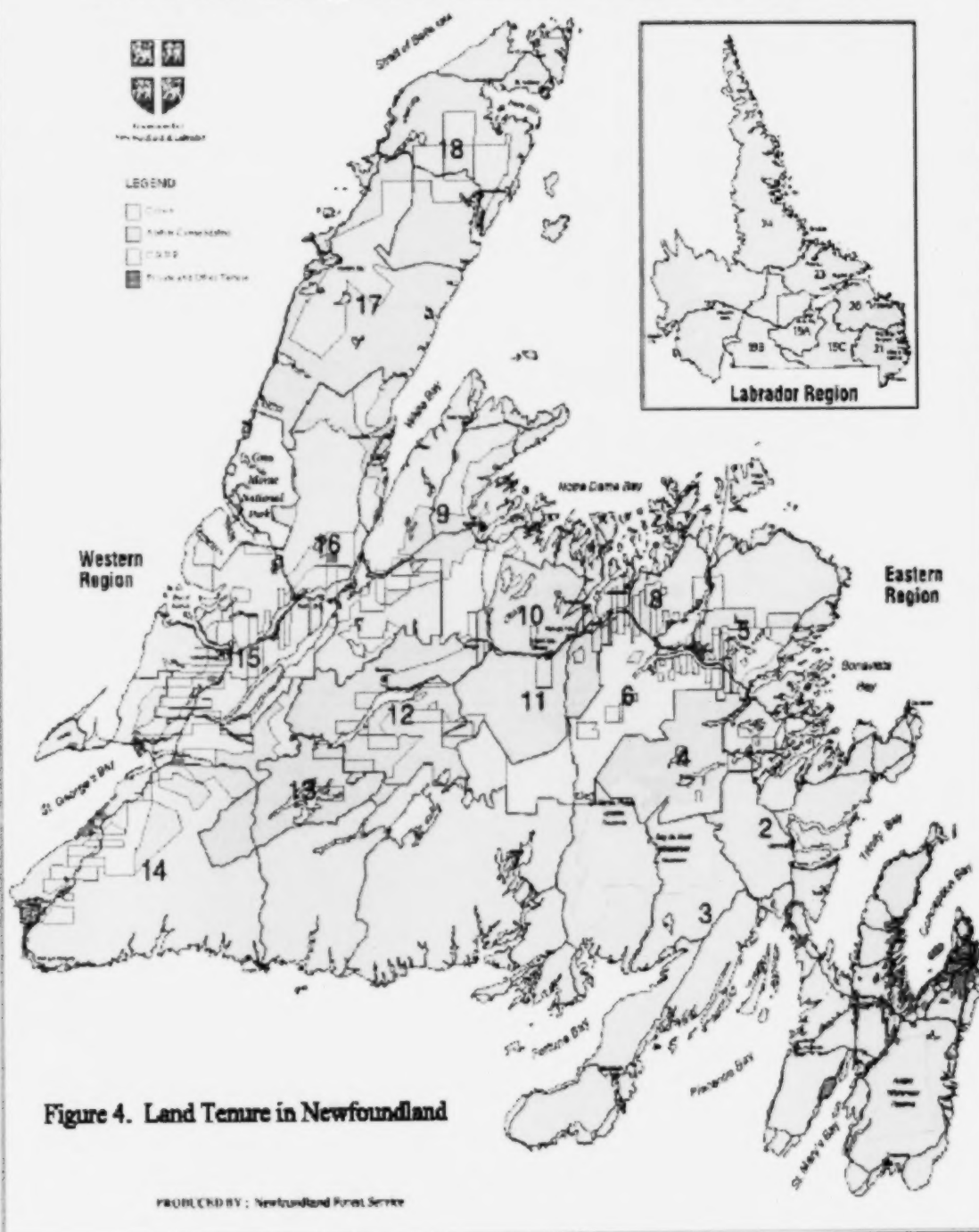
Land Class	Area (hectares)	
	Newfoundland	Labrador
1. Forested		
Productive:		-
Class I	2 036 400	-
Class III	999 600	-
Total Productive	3 036 000	5 470 500
Non-Productive:		
Softwood Scrub	2 062 700	12 531 600
Hardwood Scrub	73 600	52 800
Total Non-Productive	2 136 300	12 584 400
Total Forested	5 172 300	18 054 900
2. Water	730 500	1 902 800
3. Non-Forested:		
Soil Barren	430 600	8 359 800 ¹
Rock Barren	284 100	n/a
Bog	1 113 900	963 400
Sand	800	-
Cleared Land	17 900	38 700
Agricultural Land	14 300	-
Residential	42 900	-
Rights-of-way	14 100	-
Total Non-Forested	1 918 600	9 361 900
4. Non-Intensively Inventoried Area on Island	3 347 900	n/a
Total Land Area	11 169 300	29 319 600

¹Soil and rock barren combined

Table 2. Area of productive forest by land tenure.

	Area (hectares)	Percent (%) of Total Productive Area
By Tenure:		
Leased	123 400	4.1
Licensed	1 579 900	52.0
Ind. Freehold	69 700	2.3
Crown	1 185 300	39.0
Other	77 800	2.6
Total	3 036 000	100.0
By Resource		
Kruger	992 600	32.7
Abitibi-Price	786 400	25.7
Crown	1 185 300	39.0
Other	77 800	2.6
Total	3 036 000	100.0

NEWFOUNDLAND & LABRADOR TIMBER OWNERSHIPS



The Forest Economy

Most of the province's forest industry is concentrated in insular Newfoundland. The overall value of the forest industry to the provincial economy is over \$800 million. The industry employs directly and indirectly, 10,000 people and is the social and economic backbone of over 80 communities in the province. In 2000, forestry related activities generated a total of 7,060 person-years of employment on the island, as follows:

Source: Government of Newfoundland and Labrador, Economics and Statistics Section.

Activity	Person-Years of Employment
Pulp and paper manufacturing	2000
Primary forestry/harvesting	1240
Lumber manufacturing	3000
Converted wood products (CWP) manufacturing	500
Silviculture	320
Total	7060

total forest sector employment represents 4% of the total employed labour force in the province.

The province's forestry industry is comprised of a number of primary activities, such as harvesting and forest management, as well as secondary activities, such as lumber production and the processing of wood into newsprint. Combined, these activities accounted for 11.2% of real GDP in the goods-producing sector in 2002 and 3.6% of the total provincial GDP. Primary forestry sector activities accounted for 2.8% of real GDP and 0.7% of the total provincial GDP. Within the primary forestry sector, the pulp and paper industry accounts for about 90% of all manufacturing, value-added, shipment value, employment income and GDP. The pulp and paper

Table 3. Newfoundland and Labrador goods-producing sector gross domestic product (GDP) by industry.

Real GDP at Basic Prices By Industry, Newfoundland and Labrador, (1997\$ millions)					
Industry	1997	1998	1999	2000	2001
Total Industries	9,407.70	10,079.70	10,731.80	11,342.60	11,490.70
Goods Producing Industries	2,476.10	2,959.70	3,366.70	3,741.00	3,669.40
Agriculture	41.9	45.5	47.6	47.4	50.5
Fishing & Trapping	163.9	200.9	205.8	205.8	215.7
Logging and Forestry	92.9	59	91.9	104	97.3
Support activities for agriculture and forestry	12.7	13.9	14	13.3	13.7
Mining	385.3	406.5	325.7	405	369.5
Oil and Gas Extraction	22.4	365.8	643	939.9	969
Support Activities for mining and oil and gas exploration	69.9	110.9	109.1	204	198.8
Manufacturing	663	699	751.8	752.4	741.5
Fish Products	131.5	149.2	176.6	188.8	186.6
Pulp & Paper	"	"	"	"	"
Construction	579	560.1	707.4	665.8	538.5
Electric and Water Utilities	457.1	468.1	470.4	503.4	474.9
Service Producing Industries	6,929.80	7,120.00	7,364.90	7,601.60	7,831.30
Transportation & Warehousing	447.6	463.9	462.6	506.3	468.1
Wholesale and Retail Trade	948.7	1,006.30	1,110.90	1,158.50	1,216.30
Finance, Insurance & Real Estate and Management of Companies	1,692.00	1,723.50	1,761.80	1,810.90	1,861.40
Owner Occupied Dwellings	891.6	912.3	928.9	949.5	966.8
Excluding Owner Occupied Dwellings	800.4	811.2	832.9	861.4	894.6
Information and Cultural Industries	367	403.1	462.9	537.2	560.3
Professional, Scientific and Technical Services	226.9	247.9	271.8	285.2	288.7
Administrative, Support and Remedial Services	"	"	"	"	"
Health and Social Services	906.2	913.5	867.8	873.8	866.6
Educational Services	752.7	756.8	767.3	772.4	765.4
Arts, Entertainment and Recreation	"	"	"	"	"
Accommodation, Food and Beverage	212.4	225.2	239.5	240.9	242.8
Other Service Industries	228.4	238.3	244.3	250	262.6
Public Administration	1,011.40	1,003.60	997.3	1,003.90	1,027.90
Federal (including defence)	470.2	439.8	423.6	420.6	440.3
Defence	97	76.9	53.3	48.5	48.5
Provincial	428.1	447.4	454.7	468.8	466.4
Local	113.1	116.3	119.1	114.5	118.2

" denotes confidential data

Source: Statistics Canada, Economics and Statistics Branch, Department of Finance,
May 2002

An additional 3,085 person-years were generated indirectly through supported sectors. The industry generates almost 80% of the primary forest sector output; thus, it is the most important forestry sector industry, with logging, sawmilling, and secondary processing industries occupying secondary roles.

Newsprint Industry

Newsprint production dominates manufacturing activity in the forest sector. Newsprint production accounted for about 20% of manufacturing GDP in the province, 5.1% of GDP in the goods-producing sector, and 1.3% of the total provincial real GDP in 2001. This industry generated over 3,000 person-years of employment in 2001, representing about 1% of the total provincial employment.

The province's newsprint industry consists of three pulp and paper mills located in Corner Brook, Stephenville and Grand Falls-Windsor. In 2002, the three mills had combined shipments of 740 thousand tonnes of newsprint (table 4). Virtually all of this production was shipped to foreign markets, primarily in the United States, for a value of \$540 million. Conditions in the highly competitive foreign markets have a significant bearing on the performance of the industry in this province, as in the rest of Canada.

Table 4. Provincial newsprint and lumber production for the period 1997 - 2002.

	YEAR					
	1997	1998	1999	2000	2001	2002
Sawmill						
Production (MMfbm)	75	92	118	125	134	144
Newsprint Shipments						
(thousand metric tonnes)	741	570	722	808	746	740

Sawmill Industry

Sawmilling is the second largest manufacturing activity in the forest industry consisting of 1,670 commercial and domestic sawmills employing approximately 3,000 people in the province. The industry has experienced remarkable growth, tripling production during the past 10 years. This increase is largely attributed to higher lumber prices throughout the 1990s, increased mill efficiencies achieved by modernization, and the ability to export lumber into the United States.

The sawmill industry produces lumber for local markets in the form of small-dimension building materials like 2×3 and 2×4 studs. The provincial sawmill industry meets about 40% of the province's lumber requirements and exports approximately 50% of its production to the United States. In 1997 lumber production in the province amounted to about 75 million board feet (MMfbm) with a value of \$24 million. The 2002 production increased to 144 MMfbm at a value of approximately \$62 million.

Value-added Industry

This value-added sector utilizing our local resources consists of about 20 companies manufacturing a wide variety of secondary wood products, such as flooring, furniture, mouldings, panelling and wainscoting, exterior siding, acoustic guitars, kitchen cabinets and other types of millwork. These companies, located throughout the province, are relatively small with less than 15 employees. The industry currently creates about 200-250 person years of direct employment with an estimated economic value of \$10 million.

In recent years, the industry has made significant investment in new machinery which has enhanced the quality of locally produced products. With the acquisition of new moulders, kiln drying equipment, and other specialty machinery the industry can now compete in the global

marketplace. Two companies already export out of the country. With new product development and strategic marketing, the potential exists for further export opportunities.

CHAPTER 3: SUSTAINABLE FOREST ASSESSMENT

The Newfoundland Forest Service formally reviews the provincial timber supply every five years to account for changes in the forest landbase and new management strategies and also to account for differences detected in forest growth rates from past forecasts. The result of a timber supply analysis is a set of Annual Allowable Cuts (AACs) by tenure for each forest management district. These AACs for softwoods and hardwoods are defined as the maximum annual rate at which timber can be harvested at a sustainable level indefinitely into the future. In reality, the AACs are applicable while model assumptions and parameters hold true. Because AACs must be calculated separately for each district and tenure, there are over 30 AAC figures for the province, which provide the annual allowable commercial timber harvest. The key underlying principles that guide timber supply analysis are:

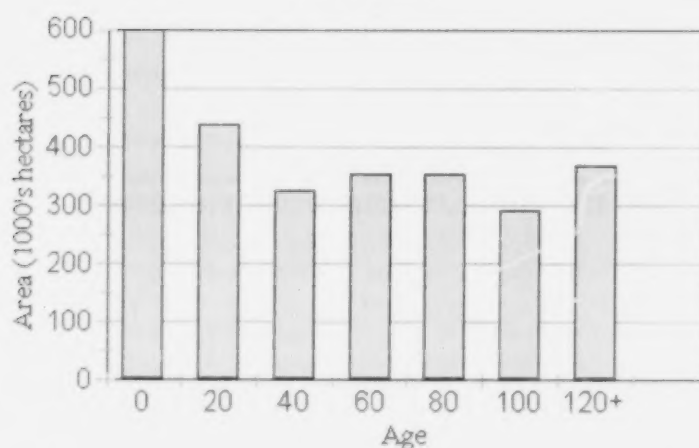
- (i) the AAC must be sustainable during the planning period;
2. the level of uncertainty associated with calculating the AACs must be minimized, using empirical information wherever possible;
3. there must be conformity between information and assumptions used in the analysis, along with actions and decisions made on the ground;
4. the analysis incorporates other forest values; and
5. the timber supply must account for economic factors and not only the physical supply of timber.

In concert with the policy of establishing sustainable timber harvest levels, the NFS policy requires that harvesting not exceed the established AACs. In the analysis, public input was

brought forward by the district managers from the Planning Team discussions. The forest industry was also consulted directly throughout the process of calculating AACs.

Understanding Timber Supply

Figure 5. Newfoundland's forest age class structure

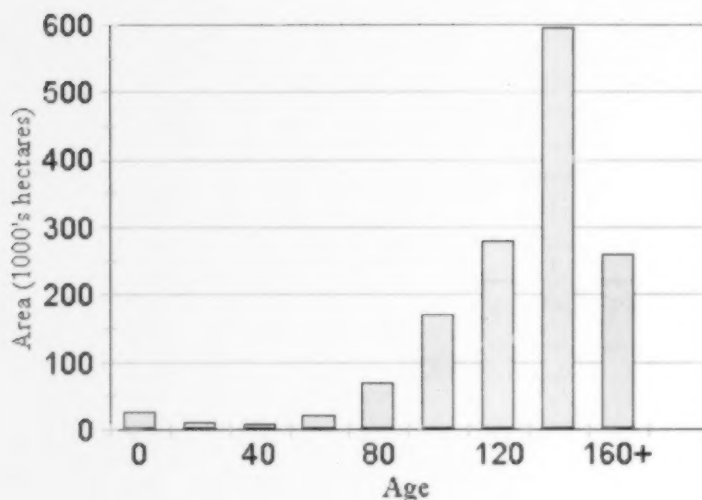


Forest Description

The forests of Newfoundland and Labrador have a variable age distribution. Typically, districts have more older forests (over 80 years) and regenerating forest than intermediate-age forests (40-60 years).

This imbalance is not unusual in a boreal forest (Figure 5), where cyclic catastrophic disturbances are common. In Labrador, where there has been minimal human impact in the

Figure 6. Labrador's forest age class structure



forest, the forest age structure is skewed heavily in the older forest. There are only small amounts of regenerating and intermediate age forests on the landscape in Labrador (Figure 6).

The lack of intermediate age forest in insular Newfoundland is the single most important factor influencing AACs at this time. The gap in the intermediate age class means a reduction in forest available for harvest, and consequently a reduction in the AACs. Once the younger forests mature, the sustainable fibre supply will increase. Therefore, it is the basis for many of the forest management strategies. Essentially, the NFS employs several measures to correct for gaps in the forest age structure. These measures include an aggressive forest protection program to keep the mature and over-mature stands alive as long as possible so that they can be harvested before they

collapse naturally, harvesting programs that attempt to exclusively target the oldest stands first to minimize the harvesting pressure on the intermediate age classes and thinning regenerating forest so that it is possible to harvest at an earlier age.

Another important aspect of the province's forest that poses a challenge to forest managers is the natural fragmentation of the ecosystem. The province's landscape is carved by many ponds, bogs, rivers, streams and rock outcrops, resulting in relatively small, scattered pockets of timber resource. This makes the determination of an economic timber supply challenging, given that the resulting landscape is a mosaic of forest stands of variable economic characteristics.

Timber Supply Analysis

In 1999, the NFS began its scheduled review of the provincial timber supply and completed it in 2001. Consistent with Government's policies as previously stated, the analysis was structured to determine sustainable timber supply, while respecting social, economic and ecological values. Timber supply, in this context, refers to the rate at which timber is made available for harvesting on a sustainable basis.

Determining the AACs involved the use of computer models that forecast the sustainability of different scenarios. These models required certain information, including a description of the current state of the forest, the growth rates associated with the current forest and the management strategies applied to the forest. This process required careful and detailed consideration of a broad range of both timber and non-timber values. More specifically, the following factors were considered in determining a sustainable timber supply.

Forest Characterization

To obtain a current description of the forest resource, the Province invested significant resources into creating and maintaining a Provincial Forest Inventory. The estimate of forest

stock is kept current through an inventory update program that is conducted each year to account for all natural and human disturbances, such as fire, insects, timber harvesting, silviculture activities, tree planting and pre-commercial thinning. Also, each forest stand is updated to reflect any changes that may have occurred since the previous inventory update.

Land Availability

The updated forest inventory was reviewed and classified on the basis of the availability of each forest stand for harvesting. The classification system consisted of two classes: Class I, available for harvest, and Class III, not available for harvest. The Class II category used in the previous wood supply analysis, which categorized stands as partially available for harvest, was dropped. Class II stands were re-evaluated and assigned to either Class I or Class III. Water supply areas comprised the largest portion of Class II area in the 1996 analysis. These areas were, for the most part, reassigned to Class I for the 2001 analysis. The result was an overall increase in the amount of forest area available for timber harvesting. This change enabled potential areas for timber harvesting to be mapped.

The categories associated with Class III area deemed unavailable for harvest, 992,800 ha, representing 33% of the total productive forest, incorporated a broad range of timber and non-timber values. These categories included the following:

No-Cut Buffer Zones: The province has guidelines requiring that all water bodies visible on a 1:50,000 mapsheet be given a minimum 20 m uncut, treed buffer. In addition to these guidelines, district managers, in consultation with Planning Teams, increased buffer zone widths beyond 20 m in many areas, to protect values, such as salmon spawning areas, cabin development areas, aesthetic areas, wildlife habitat and outfitting camps. A total of 175,600 hectares or 6% of

productive forest was withdrawn from timber harvesting.

Pine Marten Habitat: Biologists worked in consultation with the forestry community to ensure that adequate habitat remained available for the Newfoundland subspecies of the pine marten (*Martes americana*). These consultations included consideration of the quantity and quality of marten habitat. By using the new the timber supply model the team also considered how marten habitat would change over time.

Wildlife Corridors: As part of the evaluation process for timber harvesting plans, wildlife biologists recommended several no-cut corridors to ensure that many other species of wildlife have sufficient cover to move between forested areas.

Protected Areas: All established and proposed protected areas were removed from the AAC calculations amounting to 147,600 ha of productive forest or 5 % of the total productive forest.

Consideration of these non-timber values had a direct impact on the province's AACs. As the amount of productive forest land available for timber harvest drops, so too will the AAC. In light of this, only 66 % of the total productive forest on the island is available for timber harvesting. In any one year, approximately 0.25 % of productive forest is influenced by timber harvesting operations.

Besides incorporating the non-timber values, the NFS also reduced its AACs by taking into account other potential losses of timber listed below:

Insect/Fire/Disease Losses: The NFS reduced AACs to account for anticipated future losses resulting from insects, disease and fire, using historical information as a forecasting tool.

Logging Losses: Surveys of recent harvested areas were conducted each summer throughout the

province to determine the quantity and quality of remaining fibre. The estimates from these surveys were used to reduce the available AAC.

Operational Constraints: Areas that are inaccessible because they are surrounded by bogs or hills, timber on steep slopes, and low-volume stands were removed from the AACs. Also, significant adjustments were applied to the Provincial Forest Inventory to account for forest stands deemed harvestable in the timber analysis but left unharvested within operating areas. The reasons for including this factor are also related to the character of Newfoundland's forests, which incorporates many low-volume stands, steep slopes, rough terrain and excessively wet ground.

In summary, all known timber and non-timber issues were considered in defining the forested area available for timber harvesting. This area was applied directly to the AAC calculation to ensure that harvest levels do not exceed the sustainable level of the forest ecosystem. With the introduction of new forest values and the broader application of current values, changes to the AACs will continue into the future.

Growth Forecasting

A key requirement before forecasting future wood supply is an understanding of how forest stands grow and develop through time, this is referred to as yield curves. That is, as a forest stand develops, how much merchantable or harvestable volume does it carry at any given point in time? In Newfoundland and Labrador, there are dozens of distinct forest stands for which separate yield curves are required. These stands are defined by many factors including the dominant tree species, site quality and the geographic region.

Given that yield curves are a key element in the wood supply analysis, the validity, or

"usefulness," of the analysis is determined largely by the accuracy of the yield forecasts. While there is no way of predicting with certainty how forest stands will actually grow in the future, care must be taken to ensure that yield forecasts are realistic and reasonable. Respecting the sensitivity and importance of these forecasts, the NFS has directed a large portion of its resources and time into developing yield curves (Appendix 7). Two growth models were used, one for projecting stand development under natural conditions and the other for projecting growth under managed conditions, such as silviculturally enhanced forests. Tree and forest stand development data from the Provincial Forest Inventory were used to make stand growth predictions. These yield forecasts were then checked against actual data from thousands of temporary plots established throughout the province. If forecasts varied from the actual data, the yield curves were adjusted to make them more accurate.

In this analysis, special yield curves were developed for unique geographic areas. These included areas where there was a history insect activity and areas that have unique growth characteristics, such as the Main River watershed. In time, yield curves will be developed on an ecoregion basis.

Management Strategies

With the current state of the forest described and the yield forecasts developed, the next step in working with a timber supply model is to design a management strategy for each sector of the forest. The key objective is to maximize long term AACs, while also taking into account other forest values. This step involved developing strategies that minimized fibre losses and enhanced forest sustainability.

Harvest Flow Constraints

An even-flow harvest constraint means to have a constant AAC over time. This Strategy produced the maximum even-flow harvest, but resulted in less than an optimum AAC. If no even-flow constraint had been used the AACs would have fluctuated from year to year creating instability for the forest industry.

Spatial Analysis

A major change from the approach of previous wood supply analysis was the introduction of spatial modeling, where each forest stand's growth is monitored and availability for harvesting is determined. This link is critical to ensure consistency between forest management plans and field operations. This new modeling tool evaluates scenarios involving other forest values.

The spatial arrangement of areas for timber harvesting was especially challenging in this province because of the natural fragmentation of our forests. The result was partitioning of the AACs based on the perceived feasibility of accessing timber. This model provided forest planners with the ability to mimic realistic timber harvest schedules based on current practices and to identify other forest stands not as accessible for harvesting. The partitioning of the AAC was used to ensure that small isolated forest stands, which make up a significant portion of our forest resource, are targeted and used in harvesting operations. The rationale is that if these small stands contribute to the overall AAC, then they should equally contribute to the overall harvest.

Planning Horizons

Given the province's commitment to long term forest sustainability, timber supplies were forecasted for 160 years to ensure actions and strategies applied today will result in a sustainable forest into the future. Long term planning is fundamental in timber supply forecasting, and included the following considerations:

Operable Growing Stock Buffer

The NFS imposed an "operable growing stock objective" in the timber supply analysis to ensure the sustainability of the calculated AACs. This objective was a condition that in any period there must be a minimum operable AAC volume that is twice the forecasted harvest level. In other words, in any harvest period, no more than half of the accessible timber volume available may be harvested. The requirement for this growing stock buffer is related to a number of factors. First, several non-timber objectives not explicitly mentioned in the Planning Teams strategies may exist. Second, optimum harvest schedules cannot be realistically achieved due to operational restrictions. Third, the NFS is not willing to assume the high risk to sustainability of the timber supply that is imposed if the entire operable growing stock were to be harvested in any five-year period. For all of these reasons, a growing stock constraint was modeled, despite its effect of lowering the AACs.

Old Forest Targets

The NFS introduced into the wood supply analysis for the first time, an old forest objective that for the 160 year planning period, 15 - 20 % of the total productive forest within a district will be older than 80 years. This objective was designed to provide a coarse-filter approach to maintaining biodiversity and ensure the presence of certain amounts of old forest into the future. Achieving this objective also resulted in AAC reductions.

Results of Timber Supply Analysis

In the 2001 timber supply review, the softwood AACs for Newfoundland were presented as two components: base and partition (Table 5). The base AAC was calculated with assumptions that reflect current harvesting practices, while the partition AAC was separated to include forest

stands deemed economically inoperable, mostly because of their size and location. For any operation to achieve the total AAC, the partitioned component of specific, small and isolated stands must be harvested. The NFS closely reviews all operating plans to ensure compliance with these requirements.

Table 5. Summary of the 2001 Timber Supply Analysis

Management Responsibility	Annual Allowable Cut (m ³ per year)		
	Base	Partitioned	Total
Crown - Eastern Region	243,000	19,500	262,500
Crown - Western Region	241,200	29,700	270,900
Abitibi Consolidated Company	527,200	74,700	601,900
Corner Brook Pulp & Paper	786,100	83,400	869,500
Crown - Total	484,200	49,200	533,400
Company - Total	1,313,300	158,100	1 471,400
Newfoundland - Total	1,797,500	207,300	2,004,800
Labrador - Total	325,000		325,000
Hardwood - Total (Newfoundland)	128,800		
Grand Total (Softwood)	2,122,500	207,300	2,329,800
Grand Total (Hardwood)	128,800		128,800

The AAC for Labrador is for softwoods only and was calculated using area-based methodology, as growth and yield data was not available to use computer simulation models. The landbase deductions for Labrador were consistent with those applied on the island.

A hardwood AAC of 128,800 m³ has been established for Newfoundland. This is the first sustainable harvest level determination for hardwoods. The AAC is actually comprised of two

components, hardwood stands and residual stands, which are hardwoods left after softwood trees are cut.

The overall island softwood AAC dropped only slightly from the 1996 analysis, which estimated the AACs for insular Newfoundland to total 2,055,050 m³. The reason for the slight change was the partitioning of the AAC. The AACs reported in this Provincial Strategy can be changed based on improved management practices, such as better utilization of trees and forest stands harvested. Such improvements must be verified through surveys and approved by the Newfoundland Forest Service. Therefore, the actual AAC by tenure could change from that reported in this Strategy.

Supply and Demand

The amount of softwood fibre required by the forest industry in Newfoundland and Labrador will continue to exceed the calculated AACs. This situation requires the pulp and paper industry to acquire an additional 776 600 m³ per year to run their mills at current levels in this province. Additional fibre comes from the following sources:

- improving mill capacity for recycled paper;
- accessing fibre from Labrador;
- importing fibre from the Maritime Provinces and Québec;
- accessing private land;
- accessing parts of the land base not considered operable for economic reasons;
- better utilization of fibre from the AAC land base;
- increasing timber production on the AAC land base.

Notwithstanding the sustainable wood supply within the province, the pulp and paper industry has expanded considerably as a direct result of successfully obtaining additional fibre sources.

Technical Audit

The fact that there are certain gaps in the knowledge used to determine AACs means that there could be bias in the calculations. To determine the potential extent of any such bias, a technical audit of the timber supply analysis was commissioned by the NFS, Abitibi-Consolidated Inc., and Corner Brook Pulp and Paper Ltd. This audit was conducted by Dr. Thom Erdle, Professor of Forest Management at the University of New Brunswick. He reported that, "the planning process was executed knowledgeably and skillfully by a dedicated and competent staff using well accepted state-of-the-art management design tools." However, there still exists areas where the linkages between forecasting and on-the-ground operations are very weak. To address this problem in the next wood supply analysis scheduled for 2006, a concerted effort will be made to tighten some of the linkages between forecasting and field operations by incorporating some of the major operational constraints in the data preparation stages of the analysis. For example, while the age distribution of the overmature stands in the 2001 analysis was technically correct, it was impossible to correctly assign specific ages to the actual forest stands. This difference between real forest stands' ages and assigned ages makes it impossible to accurately link harvest schedules determined by the computer model to those established by the forest planners. This can potentially over-inflate the AAC. This issue will be addressed in the 2006 analysis with better stand ages data, providing a stronger link between the model's forecasting and field operations, thus leading to more accurate AACs.

CHAPTER 4: STRATEGIC DIRECTIONS

This chapter focuses on the new strategic directions the province has adopted for managing forest ecosystems. The strategic directions establish an ecological framework for planning that is designed to be consistent with the Canadian Council of Forest Ministers sustainable forest management criteria framework, as well as provincial forest values and indicators for measuring progress towards sustainable forest management. Unique actions required to ensure SFM in Labrador are also described in this chapter. On-the-ground management activities occur at the district level. Thus, district plans will reflect the provincial strategic direction set in this document.

STRATEGIC DIRECTION 1: ECOLOGICALLY-BASED FOREST MANAGEMENT

Ecosystem-Based Framework for Forest Management Planning

Ecological Requirements

Managing forest ecosystems for a multitude of values requires an ecological foundation and framework for planning and implementation. The ecological basis for management decisions will ensure the sustainability of the province's forest ecosystems, while deriving economic and social benefits. Ideally, this framework would consider all the ecological information necessary to manage forest ecosystems. However, there are information gaps, and consequently, implementation of this framework will focus on two components over the next five years:

1. The Newfoundland Forest Service will conduct a complete review and revision of its planning guidelines. Inclusion of ecosystem-based management guidelines will be a vital component of

these new guidelines. Ecosystem-based guidelines will be developed for each ecoregion in the province using the following information, creating a link between district plans and ecological management objectives:

- ecoregion boundaries;
- forest successional rules;
- biophysical mapping (where it exists);
- sensitivity of forest site types to timber harvesting activities;
- tree species composition ratios;
- forest structure (coarse woody debris by forest type);
- develop a protected areas network at the landscape and watershed levels. This will involve connecting forests areas not scheduled for harvesting with corridors (usually major river systems).

The Department of Forest Resources and Agrifoods' regional ecologists will prepare these guidelines through consultation with regional planners, district managers, Headquarters Division, Inland Fish and Wildlife Division and forest industry representatives. These guidelines will be drafted by December 31, 2003.

2. Several key information gaps exist, limiting full application of an ecological planning framework. Activities are ongoing to fulfill these information requirements, while new initiatives will be required over the next five years.

i) A biodiversity assessment program (BAP) has been initiated between the Newfoundland Forest Service, Inland Fish and Wildlife Division, Water Resources Division of the Department of Environment, Canadian Forest Service, Comer Brook Pulp and Paper Limited, Abitibi-Consolidated of Canada, College of the North Atlantic and the Western Newfoundland Model

Forest. The objective of BAP is to develop and test management tools like computer models that predict the forest forecasts under natural disturbances such as fire and insects. From these forecasts, we can analyze indicators for ecosystem diversity, forest hydrology and wildlife habitat under natural disturbances or forest management. The framework for BAP is built on forest projection models and biodiversity models.

- Data inputs to the forest projection models include:
 - yield curves and successional rules;
 - current forest inventories;
 - forest management scenarios;
 - natural disturbance regimes for the province are characterized.
- The forest projection model will generate spatially explicit forecasts of the inventory for each management scenario, taking into account the rules of growth, succession and disturbance. The biodiversity assessment models allow for the interpretation of the forests' forecasts in terms of landscape patterns, ecosystem diversity and wildlife habitat.
- The selected bio-indicators are forecast for each management strategy and are analyzed, compared and evaluated. Re-testing of management scenarios occurs until an acceptable management strategy is achieved.

The status of BAP in the province is as follows:

- The ability to forecast future forest conditions and the required information to conduct these forecasts exists.
- Determination of the natural disturbance regime for the hemlock looper (*Lambdina fiscellaria* (Gn.)) in western Newfoundland is scheduled for completion by June, 2004. The next step is to apply a natural disturbance simulator model to establish the natural range of

variation for hemlock looper disturbances and compare specific ecological indicator results when forest management actions are implemented.

- Habitat supply availability will be determined for the Newfoundland pine marten and two other species to be selected by the Inland Fish and Wildlife Division.
- By June 2003 a test analysis using the BAP management planning tools will be completed for District 15.
- Work will be initiated to determine the fire natural disturbance regime for central Newfoundland and Labrador.
- Forest hydrology models will be incorporated into the BAP in partnership with the Water Resources Division.

Work on natural disturbance regime indicators will continue in partnership with other agencies focusing on the suitability and applicability of introducing this paradigm into sustainable forest management decision-making. The Newfoundland Forest Service will continue to lead this initiative.

ii) Biophysical mapping information will be consolidated and additional biophysical mapping will be undertaken to fill in gaps. The Forest Ecosystem Management Division will take the lead to complete the biophysical mapping by March 31, 2006.

iii) Develop growth and yield curves for managed and unmanaged forest stands, based on ecologically-based forest types (Damman forest type).

iv) Determine the percentage of a watershed area that can have trees harvested with no significant impact on the hydrology of the watershed. In partnership with the Water Resources Division, the NFS will research the percentage of a watershed that can be harvested without impairing water quality and quantity.

Supporting Other Resource Management Objectives

Managing forests under a sustainable forest management philosophy requires an understanding of all forests values when making wise management decisions. The NFS utilizes four mechanisms to ensure their actions demonstrate an understanding that is consistent with defined forest values.

- ▶ Local Planning Teams assemble diverse groups of citizens, non-government organizations and government resource managers who define the forest values for the district. Through a consultative process, actions are designed to accommodate both timber and non-timber objectives.
- ▶ The Environmental Protection Guidelines for Ecologically-Based Forest Management (1998) established in the mid 1990's, through a consultative process with government resource managers, defines the on-the-ground actions necessary to be consistent with non-timber values. These guidelines will be reviewed before the end of 2003.
- ▶ All five-year operating plans and forest spray programs (i.e. application of insecticides) are subject to the *Environmental Protection Act*. This process requires a public, federal and provincial government review and a decision by the Minister of Environment on their acceptability. This review provides another vehicle to ensure forest management actions are consistent with other resource management objectives and users.
- ▶ Crown funded access road construction and all silviculture projects are submitted to the Inter-Departmental Land Use Committee (ILUC) for approval. Government departments review these projects for any conflicts with their resource management objectives. Conflicts must be

resolved before the proposed activities can be implemented.

In addition to these four mechanisms, the NFS will implement additional procedures to ensure their actions respect other values:

- ▶ Adventure tourism, parks and recreation: National and provincial parks officials will be consulted to mitigate any adverse impacts of forest management activities that occur within one kilometer of a provincial or national park.
- ▶ Water Resources (including fish): Treed buffers will be established around all water bodies in the province. The Department of Fisheries and Oceans staff will be contacted to review proposed forest management activities and recommend mitigative measures to protect fish habitat.
- ▶ Agriculture: The NFS will work with the Agriculture Branch of the Department of Forest Resources and Agrifoods to identify a land base for agriculture expansion.
- ▶ Outfitting industry: Because of the range of conditions and issues associated with each outfitting business, the NFS will meet with the outfitters on a case by case basis to address their specific issues. Additionally, the NFS will include the location of all outfitting camps in their geographic information system. The forestry community will become familiar with the location of these outfitting operations in the province.
- ▶ Wildlife: Consultation with the Inland Fish and Wildlife Division to ensure adequate habitat for any wildlife species of concern, specifically those rare, threatened or endangered.
- ▶ Historic Resources: Under the direction of the Historic Resources Division of the Department of Tourism, Culture and Recreation, treed buffers will be established or archeological surveys conducted to protect known or potential archaeological sites.
- ▶ Protected Water Supplies: The guidelines for forest management activities in protected

water supplies, as defined in the Environmental Protection Guidelines for Ecologically-Based Forest Management, will be followed and the appropriate permits obtained from the Water Resources Division.

- ▶ Mineral Resources: The NFS will consult the Department of Mines and Energy to mitigate mineral exploration and mining activity on sustainable forest management.

CRITERION 1: BIODIVERSITY

Biodiversity is a concept covering all levels of biological organization, including ecosystems, species and genes. Biodiversity offers fundamental support to human societies, economies, cultures and because of its abiotic facets, biodiversity forms one of the basic building blocks of ecosystems. While there are endless definitions for biodiversity, the NFS adopts the Canadian Biodiversity Strategy (1995) definition:

“ the variety of species and ecosystems and the natural processes of which they are part.”

Simply, biodiversity is an attribute of life, the differences among organisms. The importance of biodiversity to the province is evident through the number of strategies and conventions accepted by the Newfoundland Forest Service:

1. **A Wildlife Policy for Canada. 1990.** The goal of this policy is to maintain and enhance the health and diversity of Canada's wildlife. Accomplishing this requires monitoring and restoring biodiversity.
2. **Convention on Biological Diversity. 1992.** At the 1992 United Nations Conference on the Economy and Environment in Rio de Janeiro, Brazil, Canada signed a Convention on Biological Diversity. The objectives of this convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the

benefits arising out of the utilization of genetic resources (United Nations 1992).

3. **National Forest Strategy (1998-2003).** The National Forest Strategy is meant to guide Canada's efforts in sustainable forest management as we enter a new millennium. The 1992 National Forest Strategy reflected Canada's forest related commitments made at the United Nations Conference on the Environment and Development. The present national strategy (1998-2003) furthers that work and reflects the commitments made under agreements such as the Convention on Biological Diversity.

4. **Canadian Biodiversity Strategy, 1995.** The Canadian Biodiversity Strategy is Canada's response to the Convention on Biological Diversity. The strategy provides a framework for action at all levels that will enhance the ability to ensure the productivity, diversity and integrity of forest ecosystems. It promotes the conservation of biodiversity, the sustainable use of biological resources, and describes how to contribute to implementing the Convention of Biological Diversity.

Ecosystem, species and genetic diversity define the three ecological scales to address biodiversity. Ensuring the protection of forest biodiversity is fundamental to the Newfoundland Forest Service's vision and mission statement. Understanding the forces that create and maintain forest biodiversity in the province is important for three reasons:

- ▶ Trees provide the primary habitats for many organisms and fungi, therefore forest management can profoundly alter biodiversity by altering habitats;
- ▶ Diversity probably plays an important role in stabilizing forests against stresses such as climatic fluctuations and pest outbreaks.
- ▶ Many processes involving the survival and regeneration of trees may be dependent, in part, on other organisms, such as ectomycorrhizal fungi, insect pollinators and predators of

host pathogens or herbivores.

With this understanding, the NFS has established six key biodiversity issues pertaining to managing forest ecosystems in the province:

- ▶ Effects of forest management activities on forest fragmentation, habitat loss and vegetative species composition;
- ▶ Loss of forest wildlife species;
- ▶ Determination and management of old-growth forests;
- ▶ Reduction in site productivity;
- ▶ Preservation of water systems;
- ▶ The establishment and maintenance of protected areas.

The NFS, in cooperation with other government departments, industry, non-government organizations and the public, will implement a biodiversity program to the extent its human and financial resources will allow. The following values, goals, indicators and actions define the NFS approach to forest biodiversity:

Element: Ecosystem Diversity

Value 1.1: Representative landscapes

- Goal 1: To work with the Department of Tourism, Culture and Recreation to recommend protected areas that will provide adequate representation of each ecoregion.
- Goal 2: Represent adequately the various forest successional stages in the province.
- Indicator:
- Proportion (hectares) of each ecoregion in protected area status.
 - Proportion and extent of area by forest type and age class in protected

areas.

Actions:

- ▶ While the NFS has no legal mechanism to establish protected areas, it supports such areas and is actively involved in a process with the Department of Tourism, Culture and Recreation to resolve any conflicts with the Natural Areas System Plan. These areas were removed from the AAC land base.
- ▶ To sustain spruce component of regenerating forests in central and eastern Newfoundland, spruce will be favored as the preferred species during thinning and planting operations.

Value 1.2: Special Places

Goal 1: To establish protected areas or special management provisions to preserve biologically distinctive or unique features.

Indicator: • Area (hectares) of biologically distinctive or unique features protected or treated with special management provisions.

Actions:

- ▶ A policy is in place to conserve white pine in the province.
- ▶ A conservation and management plan for red pine and black ash will be completed by June 30, 2004.
- ▶ In an effort to increase the amount of pine trees in our forests, the following actions will be undertaken:
 - both pines will be included in the province's reforestation program;
 - research will continue to develop management techniques, such as pruning and time-of-planting, and fertilization for reducing losses of white pine to blister rust;

- to the extent possible, local seed will be used to grow pine seedlings;
- continue to maintain a white pine seed orchard/ gene conservation garden;
- continue to maintain the red pine seed orchard/ gene conservation garden.
- protection for red pine stands exists in the West Brook Ecological Reserve and Grants Pit. Similar protection will be extended to white pine and black ash stands/trees.

- The NFS defines old growth forests as:

“a forest of live and dead trees of varying sizes, areas and spacing which includes large snags and down logs of varying decay classes, gaps in the tree canopy and a multiple layered canopy.”

- Based on this definition, the amount and location of old growth forests will be determined.

Appendix 8 provides a detailed discussion on old-growth forest.

- Management actions in this forest will be consistent with their natural processes.

Element: Species Diversity

Value 1.3: Wildlife Habitat

Goal 1: Maintain and protect terrestrial wildlife habitat.

- Indicators:
- Area of habitat and population levels for known forest-dependent species classified as endangered, threatened and vulnerable on national and provincial species at risk lists.
 - Population levels for moose (*Alces alces*) and caribou.(*Rangifer tarandus*).

Actions:

- The NFS will continue its development of BAP, including applying the habitat supply model

for the Newfoundland pine marten and developing habitat supply models for two other wildlife species.

- Forest corridors will be established at the regional scale to maintain habitat connectivity across the landscape. District planning will incorporate these regional corridors and also apply corridors at the watershed level. The Department will lead this initiative in partnership with the Inland Fish and Wildlife Division of the Department of Tourism, Culture and Recreation and industry representatives.

CRITERION 2: MAINTAINING HEALTHY FORESTS

Silviculture

Silviculture is described as the art and science of controlling the establishment, growth, composition, and quality of trees. Today, silviculture has become a diverse program, which directly influences the forest ecosystems of the province. Silviculture has three primary goals:

1. To maintain ecosystem health, productivity, resiliency and integrity;
2. To help alleviate the wood supply deficit; and
3. Enhance the quality and quantity of future forest stands and ultimately, wood supply.

Forest Improvement

The primary treatment is pre-commercial thinning, but also includes commercial thinning, diameter limit thinning, vegetation management. A tree improvement program for genetic enhancement of tree species for volume and quality of timber is a separate and distinct part of the provincial silviculture program.

Reforestation

Reforestation is considered basic silviculture whose aim is to maintain and improve the productivity of forest ecosystems by ensuring the prompt regeneration (either natural or by

planting) of cutovers and naturally disturbed areas. Over 95% of the seedlings planted are native species, with more than 90% being black and white spruce. In keeping with the province's commitment to biodiversity, this reliance on native species will continue. Black and white spruce will remain the reforestation species of choice and through a process of continual improvement, the genetic gains will result in increased yields over time.

Planting levels will increase over the next five-year period from an average of seven million seedlings per year to approximately 10 million per year in 2006. Additional nursery tree growing capacity will be constructed at Wooddale Provincial Tree Nursery to meet the increased requirements.

Element: Incidence of disturbance and stress

Value 2.1: Natural Processes and Ecosystem Health

Goal 1: To maintain the natural processes of forest ecosystems within the province.

Goal 2: Maintain the resiliency and vigour of forests.

Indicators:

- Proportion by area of not-sufficiently regenerating.
- Tree species composition ratio by ecoregion.
- Proportion of area occupied by kalmia (*Kalmia angustifolia* L.) and mountain alder.
- Area of forest disturbed by fire, timber harvesting, insects and disease.

Actions:

- Maintain a 5 to 15 year supply of forest tree seed.
- Improve the genetic quality and yield of plantations through continued management of black

and white spruce and white pine seed orchards.

- ▶ Utilize the abundance of natural regeneration that occurs after disturbance.
- ▶ Plant areas that do not regenerate naturally following disturbance.
- ▶ Where appropriate, direct seed large burnt areas.

Element: Ecosystem productivity

Value 2.2: Natural productive capacity

Goal 1: In areas that are managed for timber production, maintain and/or enhance tree productivity.

- Indicators:
- Mean annual increment (MAI) for tree species by ecoregion.
 - Area planted and thinned.

Actions:

- ▶ The pre-commercial thinning program will continue at levels identified in the wood supply analysis.
- ▶ A small, but focused thinning program will target the more productive sites by thinning to higher densities to facilitate long term management options, such as commercial thinning.
- ▶ In areas where non-crop vegetation continues to pose a problem vegetation control measures will be undertaken, ranging from the application of herbicides to manual clearing.
- ▶ On most sites, balsam fir regeneration is typically abundant following harvesting. Generally, the management strategy has been to take maximum advantage of this regeneration by thinning. This concept is the foundation of the pre-commercial thinning program. Unfortunately, managing balsam fir is a challenge because it is the preferred host of a number of native and exotic insects, is browsed by moose and is highly susceptible to butt and stem rots. Additionally, in the absence of fire, fir has aggressively invaded harvested sites that are ecologically better adapted to black

spruce. To offset the over aggressive regeneration capability of balsam fir, the following practices will continue to be taken:

- Gap planting of black and white spruce in and around fir regeneration to improve the proportion of spruce stocking in the stand;
 - Scarification and planting with spruce seedlings will be carried out on spruce-origin sites that have become stocked with fir; and
 - In areas of severe moose browsing, plant spruce trees through the fir regeneration, with the intention of removing the fir later through thinning.
- Native tree species do not always maximize the growth potential of our forest sites. Since the 1930's, considerable effort has been invested in evaluating the performance of various non-native (i.e.exotic) trees under Newfoundland and Labrador conditions. Several non-native tree species have performed very well and have demonstrated the capacity to clearly outgrow native species on certain sites. The Newfoundland Forest Service will plant and intensively manage exotics on select forest sites with the objective of supplementing the fibre supply from natural and managed native stands. As a guiding principle, exotics will represent no more than 5% of tree nursery production. Since less than 20% of harvested sites are planted, it is doubtful that exotic plantations will ever constitute more than 1% of the forested area.

Any exotics considered for inclusion in the province's reforestation program must meet several stringent criteria:

- They must demonstrate better growth than native species;
- Be compatible with existing forest industry;
- Be compatible aesthetically and ecologically;
- Pose no threat to the survival and growth of native forest species; and

- Not occupy the sites with highest ecological potential where native trees also exhibit superior growth potential and diversity.

Currently, the most promising exotics are Japanese larch (*Larix kaempferi* (Lamb.) Carriere), European larch (*Larix decidua* Mill.), Norway spruce (*Picea abies* (L.) Karst.) and Sitka spruce, (*Picea sitchensis* (Bong.) Carriere) which all belong to species that are native to the island (i.e., *Larix* and *Picea*).

CRITERION 3: SOIL AND WATER

Lakes and ponds in the province range in size from small peat-bog ponds of a few hundred square meters to lakes having surface areas in the hundreds of square kilometers(km²). It is estimated that water is approximately 7% of the surface area of the province. The largest body of water in the province is the Smallwood Reservoir on the Churchill River in Labrador. It has a surface area of 3,640 km². On the island, the largest water body is Grand Lake with a surface area of 354 km².

Water bodies are an important component of the natural environment. They are habitat for a variety of aquatic life and are food sources for several terrestrial animals. Lakes and ponds are integral components of river systems influencing the hydrology of watersheds. The storage capacity of lakes and ponds alleviate flood flows and stored water is released gradually over a longer period of time. In addition, water has a significant role in the social and economic welfare of people in the province.

Under the *Water Resources Act* 2002 communities are able to designate water supplies as protected areas. A total land area of 2,965 km² is comprised of more than 243 protected water supply areas across the province. Of this total area, about 1,400 km² are suitable for timber harvesting. The primary management goal within protected water supplies is the maintenance of

water quality and quantity. Forestry activities are permitted within a water supply zone, subject to a certificate of approval for the Department of Environment and approval from the local municipality.

Soils are a product of organisms and climate acting on rocks. It is a complex mixture of minerals, organic matter and organisms. Many kinds of organisms are part of the soil ecosystem, but plants are the ultimate source of carbon, which is the critical structural component of soil and source of energy fueling the processes that occur in soils.

Approximately 75% of Newfoundland has mineral soil. The remainder is peatland (15 %), water bodies (7%) and rock barrens (3%). The mineral soils are largely derived from glacial till deposits. In general, deep till deposits are found in valley systems while upland areas are dominated by thin veneer deposits overlying bedrock. Podzols are the primary zonal soil in the province. Maintenance of soil characteristics is essential to the productivity of forests ecosystems. Forest soils must be managed and protected to maintain their productive capacity.

Value 3.1: Water

Goal 1: Maintain naturally occurring flow rates and water quality.

Indicators:

- Canadian water quality standards.
- Flow rates of selected waterways.

Actions:

- In partnership with the Water Resources Division of the Department of Environment, the Newfoundland Forest Service will research and determine the percentage of a watershed that can have timber harvesting without impairing water quality and quantity.
- Continue to conduct watershed studies to evaluate the influence of forest management actions on water quality and quantity. The Copper Lake Watershed study was completed in the

mid -1990's and the results found no impact of water quality or quantity with 20m or 100m buffers. The longest ongoing watershed study is in the Corner Brook Watershed, where timber harvesting began in 1986 and water quality sampling has been conducted ever since. An evaluation of the water samples was conducted by graduate students from Memorial University in 1999, which determined that timber harvesting activity had not impacted water quality or quantity. In 200, a new watershed study was initiated in the Triton Brook Watershed. Partners in this study are the Newfoundland Forest Service, the Department of Fisheries and Oceans, Water Resources Division, and the Canadian Forest Service.

Value 3.2: Soil

Goal 1: Maintain soil volume and bulk density during forestry operations.

Goal 2: Maintain long-term pools of soil nutrients.

Indicators:

- Proportion of total productive forest area without measurable soil erosion and soil compaction due to forest operations.
- Proportion of forest land base occupied by permanent forest access roads.
- Proportion of area harvested using full-tree logging technology.

Actions:

- ▶ The NFS has been actively reviewing and revising the guidelines for the measurement of ground disturbance. What actually constitutes excessively disturbed areas and how can they be easily measured in the field are some of the questions to be resolved. It is anticipated a new set of guidelines will be accepted and used in the province by 2004.
- ▶ Permanent sample plots to assess the resilience of disturbed areas will be remeasured periodically over the next 10 years to provide information to refine measurement guidelines.

- ▶ The NFS is working with the Forest Engineering Research Council (FERIC East) to develop a video on soil rutting and compact for eastern forest conditions. This training video should be available to operators early in the spring of 2003.
- ▶ The NFS staff will continue to conduct on-the-ground assessments of harvested areas to more accurately determine the amount of area excessively disturbed.
- ▶ The NFS will work with FERIC to develop a guide for minimizing ground disturbance in Eastern Canada.
- ▶ The NFS to investigate new methodology to streamline the utilization data collection process.
- ▶ The NFS will work with Corner Brook Pulp and Paper Limited in the use of infrared aerial photographs to assess ground disturbance.
- ▶ Continue to deactivate and rehabilitate old abandoned access roads. While the majority of this work has been done on the Avalon, it is anticipated it will be implemented in other districts throughout the province.
- ▶ The NFS will continue to develop a comprehensive resource roads database to be completed in 2003. Once developed, it will provide forest managers with an effective tool for planning new roads and for deactivating older ones.
- ▶ Continue to have workshops with Crown operators on minimizing ground disturbance through the Frontline Training Program and through the use of information bulletins.

CRITERION 4: GLOBAL IMPACTS

Carbon Accounting

Climate change is a global problem affecting all countries. While greenhouse gases (GHGs) form naturally, many human activities add additional GHGs, such as carbon dioxide to the atmosphere. Radiation from the sun enters the earth's atmosphere and GHGs act like a

greenhouse to block this heat from escaping back to space. However, forests can remove and store carbon dioxide from the atmosphere, thereby reducing the impact of GHGs on the atmosphere. The storage of carbon by forests are called "sinks", and carbon sinks can be managed through sustainable forest management practices.

In 1997, more than 160 countries agreed to targets to reduce GHG emissions in what today is called the "Kyoto Protocol". One of the mechanisms in the Protocol will permit developed countries to buy and sell credits (carbon) among themselves. While the Protocol is experiencing turbulent times and changes, the NFS accepts the role of forests as carbon sinks and the potential to sell the carbon credits. Therefore, to position ourselves with respect to this initiative a carbon accounting analysis will be conducted for the province during the next five years to establish the amount of carbon being stored in the province's forests.

Element: Carbon cycles

Value 4.1 Forests as carbon sinks

Goal 1: To maintain and enhance carbon sinks in the province.

Indicators: • Net mass of carbon per unit area accumulated in the forest.

Actions:

• A partnership between the Newfoundland Forest Service, the Canadian Forest Service, the Western Newfoundland Model Forest and Sir Wilfred Grenfell College will develop a model to estimate carbon storage for the forests of the province. Carbon estimates are anticipated by March 31, 2006.

Value 4.2 Forest land conservation

Goal 1: No permanent net loss of forest area due to human activity.

Indicators: • Area (hectares) of permanent forest depletion.

Actions:

- As part of each wood supply calculation a land base analysis is undertaken to determine the area available for timber harvesting. Each land base analysis can be compared to previous analysis to determine if there has been a permanent depletion in the land base for timber harvesting.

STRATEGIC DIRECTION 2: ECONOMIC CONSIDERATIONS

CRITERION 5: ECONOMIC AND SOCIAL BENEFITS

FOREST INDUSTRY

Pulp and Paper

Three pulp and paper mills operate in the province. One mill is located in Corner Brook and operated by Corner Brook Pulp and Paper, while two mills are operated by Abitibi-Consolidated of Canada and are located in Grand Falls and Stephenville. The combined product shipment in 2002 was 740,000 tonnes at a value of \$540 million. The industry currently utilized approximately 2.1 million cubic meters of fibre in the year 2001/02. This requirement is projected to increase to within 2.248 million cubic metres of fibre per year, over the next five years.

Notwithstanding the sustainable wood supply, the pulp and paper industry has expanded. The speed-up of mill machines by Corner Brook Pulp and Paper Limited and Abitibi-Consolidated Company of Canada in Stephenville has resulted in additional newsprint production. However, the production at Abitibi's Grand Falls mill has reduced due to the closure of two paper machines.

Sawmill

Historically, the sawmilling industry has been an important component of the rural economy. Small "push-bench" sawmills were distributed across the province. While such mills still exist today, the expansion of the sawmill industry has led to large integrated sawmills. The sawmilling sector has seen the greatest expansion within the forest industry with production levels of 29 MMfbm in the late 1980's rising to 144 MMfbm in 2002. About 60 MMfbm is exported annually to the United States. Today, most of the sawn lumber is kiln dried, which has improved the marketing prospects for Newfoundland and Labrador products. Integrated sawmills have secured a supply of sawlogs from pulp and paper company limits through transfer agreements. Many of these mills also obtain sawlogs through exchange agreements or by purchasing sawlogs directly from the pulp and paper companies. Sawlogs have also been secured from Labrador and through timber sale agreements for wood on Crown land. Fibre availability has also increased due to improved harvesting utilization in the woods, plus lumber production has increased due to improved technology in the mills.

Secondary or Value-Added Manufacturing

In the past 10 years, the forest industry has expanded significantly in secondary manufacturing. In fact, the secondary wood products industry has grown from a few companies manufacturing cabinetry, mouldings, and furniture, to a larger industry producing an expanded product base. This expansion is the result of the Department of Forest Resources and Agrifoods and the Newfoundland and Labrador Forestry Training Association's (NLFTA) aggressive technology transfer and training programs. Initially, concentrated in central and eastern Newfoundland, the increased use of larch, birch and aspen has spread the value-added industry to virtually every region of the province. Product lines have expanded to include flooring, mill work, paneling products and acoustic guitars, which are sold internationally. Provincially, approximately 20

companies are currently involved in value-added wood products using local lumber, employing between 200 to 250 workers.

The synergies between the pulp and paper, sawmilling and secondary manufacturing sectors have evolved over the last decade and have fostered steady progress in improved utilization and manufacturing of wood fibre in the province. The Newfoundland Forest Service will continue to build on the strength of cooperation and synergies between the pulp and paper industry, sawmilling and secondary manufacturing industries through facilitation of dialogue, exchange of information and encouragement of further fibre exchanges. The NFS and the NLFTA will continue to provide assistance in technology transfer in improving fibre utilization and efficiencies in manufacturing, as well as search for new value-added products and markets. The NFS is committed to help maintain the current flow of fibre among various players in the industry.

In addition, the NFS will focus with a new vigor on increasing value-added products. Newfoundland's fibre resource is too valuable to be commoditized and sold as studs. The characteristics of Newfoundland fir and spruce demand that they be manufactured into more valuable products. The less common species of larch and birch have also found niches in the marketplace.

Non-timber forest products

An economic opportunity exists in the development of a non-timber forest products industry in this province, which today is a \$500 million industry in Canada. A limited industry exists in the province, involving such products as blueberries (*Vaccinium angustifolia* Ait.) and partridge berries (*Vaccinium vitis-idaea* L.), tree cones and balsam fir tips for wreaths, caribou moss (*Cladonia rangiferina*) for the craft industry, and Christmas trees. There have been several

inquiries into harvesting Canadian yew (*taxus canadensis* Marsh.) and mushrooms. During the next five years, the Department will be proactive in developing the potential economic opportunities from this sector.

Element: Economic benefits

Value 5.1

Commercial Timber

Goal 1: To establish and maintain long term sustainable wood supply levels for each management district.

Goal 2: Increase the sustainable timber harvesting levels.

Goal 3: Increase the utilization of trees harvested.

Indicators:

- Allocated and actual harvest levels.
- Total forested area and the amount available for commercial timber production.
- Mean annual increment (average tree growth) on silviculturally treated areas.
- Volume of merchantable timber remaining on site after harvesting.

Actions:

The following actions are critical to maintaining the province's AACs:

- Harvesting forest stands as allocated through the wood supply analysis. Harvesting stands not allocated, will impact future sustainable harvest levels. District staff will monitor forest stands proposed for harvesting for compliance with the wood supply analysis.
- One of the assumptions in the wood supply analysis is 100% availability of forests stands scheduled for harvesting. Therefore, it is critical that forest access roads be constructed to allow access appropriate forest stands. A more detailed description of the roads program is available

in Appendix I.

► Forest protection from fire and insects is required. Significant loss of forest stands through insect mortality and forest fires will impact the future sustainable harvest levels. Consequently, the NFS will continue to invest in forest protection. The fire suppression program will continue with seasonal fire patrol staff employed throughout the province during the fire season. The NFS will pursue purchasing new CL- 415 water bombers to improve fire suppression measures.

Development of better solutions to new insect infestation problems is an ongoing process. With the recent rise of balsam fir sawfly (*Neodiprion abietis* (Harr.)) population in pre-commercial thinings areas on the west coast, it was found that no acceptable solution was available. As a result, the NFS and industry, in partnership with the Canadian Forest Service, have been successful in isolating a natural virus in the population which, when present in sufficient numbers, appears to control the insect. The virus is very specific to sawflies and can be successfully raised through field techniques for insertion into the general population. The partners are now in the process of developing a registration package for submission to the Pest Management Regulatory Agency for operational use of the virus. This demonstrates how the environmental integrity is being protected while a major socio-economic problem associated with our future forests has been cultivated and will serve to support our industry in the future.

Integrated pest management must go beyond development of biological insecticides and address the broader question of how management actions can deter insect population levels from becoming epidemics. A partnership between the forest industry, the NFS, the Canadian Forest Service and Memorial University of Newfoundland will generate research and test new timber harvesting and silviculture treatment design patterns to determine their ability to deter insect populations from expanding beyond endemic levels.

For more information regarding the fire suppression, insect spray programs and integrated pest management applications in the province, refer to Appendix 1.

- ▶ Improve harvesting utilization of individual trees and forest stands.
- ▶ Silviculture levels defined for all AACs must be achieved for the sustainable harvest levels to be maintained.

- ▶ Expanding the forested land available for timber harvesting will potentially increase the AAC.

Over the next five years the NFS will look at ways to expand the forested land for harvesting.

- ▶ A pilot program will be initiated to conduct selective harvesting in buffer zones established around water bodies. The objective is to extract timber from the buffer zones and still maintain the integrity of the buffer zone.

- ▶ The traditional and long held view of hardwoods as a "non-commercial" species is slowly changing. The value-added hardwood sawmilling sector is being recognized as a legitimate and evolving industry. To maximize the use of hardwoods for commercial and domestic purposes, AACs were calculated and will form the basis for managing the hardwood resource of the province. Concurrently, a Hardwood Management Strategy for Newfoundland and Labrador was developed (Appendix 9) and will be implemented during the next five years. The principles of this strategy are:

- Poor utilization of hardwoods should not be tolerated under any circumstances.
- The hardwood sawmilling sector should be recognized as an important and evolving industry and be given full consideration in forest management plans for resource allocations, improved inventory information, forest access and security of supply.
- Traditional fuelwood harvesting is a legitimate use of lower quality hardwoods.
- A comprehensive domestic fuelwood harvesting policy be developed for both

softwoods and hardwoods.

- A hardwood strategy should be part of all five-year operating plans.
- Priority should be given to the value-added sector for the allocation of quality hardwood sawlogs up to 20,000 m³ per year.
- Complete utilization of hardwoods is to be practiced by all sectors.
- Silviculture techniques must be developed to better manage the hardwood resource.

In this regard, the establishment of annual and five-year targets for silviculture treatments should be developed.

Initial assessment of the hardwood resource indicates there is very little room for any major expansion of this industry. However, the industry has the potential to produce high quality products, increase employment and economic activity and develop into a small, but important industry, especially for rural areas of the province. Hardwoods harvest levels will be based on the hardwood AAC and proper utilization.

Element: Distribution of benefits

Value 5.2 Forest Industry Development and Employment

Goal 1: To maximize employment benefits derived from all uses of the forest resources.

Goal 2: To diversify forest-based, revenue-generating activities.

- Indicators:
- Number of people employed in each forest-based activity.
 - Forest-related employment per unit volume of wood harvested.
 - Value of paper and value-added manufacturing of timber per volume harvested.
 - The number of timber and non-timber based industries.

- Contribution of timber products to the provincial gross domestic product

Actions:

- ▶ Encourage a mechanism for purchase of sawlogs and pulp fibre.
- ▶ Facilitate fibre exchanges between the pulp and paper companies and the sawmill and value-added industries.
- ▶ Facilitate improved fibre utilization and increase use of recycled fibre.
- ▶ Encourage value-added products in all aspects of the forest industry.
- ▶ Develop, implement, and maintain policies and programs which sustain the private enterprise and free market system and ensure lasting duty-free status of Newfoundland and Labrador lumber.
- ▶ Continue to improve fibre supply through intensive silviculture on Crown lands.
- ▶ Manage the hardwood resources more intensively in order to facilitate quality hardwood products in the province.
- ▶ Initiate a major marketing effort to seek offshore markets for locally produced hardwood products.
- ▶ Implement a pilot project to coordinate the flow of hardwoods and eastern larch in the province. This project will facilitate the flow of hardwoods directly from industry contractors and from unalienated Crown lands to operators of the secondary wood products manufacturing sector.
- ▶ Establish two pilot wood yards where harvested hardwoods, larch and some softwoods are concentrated and sorted for best end use. High quality hardwood logs will flow from the wood yard to the value-added sector, while low quality hardwoods will be directed to the fuelwood

sector.

- ▶ Support the Newfoundland and Labrador Forestry Training Association in its endeavors to provide much needed research and services in the value-added sectors, especially in terms of technology transfer, training and marketing.
- ▶ To provide opportunities for the employment of women in the forest sector.

The following human resource data will be a requirement of all Crown silviculture contracts:

- names and qualifications of silviculture workers, forest technicians, supervisory personnel.
- a human resource strategy will be prepared to increase the participation of women in the forest industry.

Value 5.3 Recreation

Goal 1: Increase the amount and diversity of forest-based recreational activities.

Indicators: • The kilometers of hiking, cross-country skiing and snow mobile trails.

Actions:

- ▶ The NFS and forest industry will continue to cooperate with local recreation clubs to establish and enhance recreation opportunities.

Value 5.4 Forest products for personal use

Goal 1: Provide for a sustainable domestic harvest of wood.

Indicators: • Volume of wood allocated for domestic use.

Actions:

- ▶ Allocation of low volume and burnt forest stands for domestic firewood use will continue.
- ▶ Domestic cutting areas will be defined.
- ▶ Lower volume forest stands will be allocated for domestic use.

- Mitigate the impact of domestic timber harvesting on the forest industry.

STRATEGIC DIRECTION 3: SOCIAL CONSIDERATIONS

The social environment within the province that forest managers must operate within today differs dramatically from the environment that existed a decade ago. Forest management practices are increasingly coming under public scrutiny. Citizens of Newfoundland and Labrador are demanding that a broad range of social, economic and ecological values be considered in forest management. To incorporate the range of values, the Newfoundland Forest Service adopted Planning Teams where local citizens and organizations participate at the district level.

District plans must address timber harvesting impacts on these values, such as endangered species, outfitting, tourism, historic resources and fish and wildlife habitat. Public input is obtained through local citizens and organizations participating in open and transparent discussions and debate. This approach, however, has generated many planning challenges for the NFS in finding a balance between the multitude of forest values, how to format and document such a plan and how to implement the agreed actions and commitments.

Domestic use of trees for fuelwood and sawlogs has always been part of the province's heritage, beginning with aboriginal and European cultures. In 1776, an order of Governor Hugh Palliser stated "lands that are not actually fenced in shall remain open for the public and common to all persons without distinction, to cut wood for the purpose of fuel". Even to this day, residents of the province continue to utilize timber for domestic purposes and consider this utilization an inherent right. A survey conducted in 2001 estimated that 44% of households in Newfoundland and Labrador used wood to heat their homes. This translates into an estimated

439,000 m³ of timber being cut every year for burning.

Compliance

The NFS is responsible for the enforcement of various legislation that enables the wise use and protection of the forest and wildlife ecosystems in the province. This legislation includes the *Forestry Act*, *Wildlife Act*, *All Terrain Vehicle Act*, *Ecological Reserves Act* and the *Endangered Species Act*. Also there is a shared responsibility with other provincial and federal agencies to enforce federal legislation, including the *Migratory Bird Act* and the *Newfoundland Fisheries Regulations*.

The compliance and enforcement program occurs through the Department's 14 district offices, including several satellite offices that make up the three regions of the province. Approximately 150 conservation officers participate in varying degrees of enforcement within their respective districts and work diligently to protect our forest and wildlife resources. There are challenges in implementing a strong and consistent enforcement program throughout the province. The Department is addressing the challenges by identifying priorities and accepting responsibility to protect and manage natural resources to ensure all citizens will be able to continue using our outdoor resources.

In 2002, there were over 1,400 wildlife and forestry violations involving a combination of written warnings and charges, which indeed demonstrates the effectiveness and high calibre of the Department's integrated enforcement team. Government is committed to high training standards and providing the necessary equipment to allow conservation officers to continue their effective enforcement efforts and protection of the province's forest and wildlife resources.

The Department's compliance program also includes analyzing the pulp and paper companies' annual operating plans and if approved, an annual certificate of managed land is issued to each

company. The certificate contains conditions that must be implemented to maintain the managed land status. The NFS conducts a rigorous program to monitor harvesting and silviculture activities on industry land. Field staff frequently inspect forest operations for compliance with fire regulations, approved operating conditions and compliance with the Environmental Protection Guidelines for Ecologically-Based Management. Monthly reports are prepared by district staff and forwarded to the appropriate company. Where serious violations occur, the district office contacts the company immediately. Likewise, silviculture areas are monitored to ensure quality standards are maintained. These monitoring reports play an important role in determining the management status of an operating area or a management district.

The Department's enforcement program will continue to strive for fairness and consistency by keeping abreast of evolving changes in the judicial system and working closely with other enforcement agencies and government departments. Legislation is continually being revised so that the mandate of sustainable forest management and protection of the province's natural resources can be achieved.

CRITERION 6: SOCIETY'S RESPONSIBILITY

Element: **Aboriginal Involvement**

Value 6.1 **Aboriginal perspectives and involvement**

- The NFS and the aboriginal groups in Labrador will develop the appropriate goals and indicators for this value.

Element: **Forest community well-being and resiliency**

Value 6.2 **Forest contribution to community sustainability**

Goal 1: Ensure that ecosystem-based forest management contributes to the well being of communities.

Indicators: • Number of households in communities that have forest-based

employment.

- Number of households in a community that heat their home with wood.

Actions:

- Changes in technology, fibre availability and markets all influence employment and a community's well being. The NFS will track changes in forest-based employment and domestic use in communities across the province.

Element: Fair and effective decision-making

Value 6.3 Fair Decision-making

Goal 1: Use active public participation in forest management planning and other forest decision-making processes.

- Indicators:
- Number of public participation processes to prepare ecosystem-based forest management plans.
 - Proportion of participants who are satisfied with their involvement in public planning processes.

Actions:

- All districts will have Planning Teams to assist the district managers in preparing the five-year operating plans.
- Value maps will be created, defining the location of all forest values in each district.
- Socio-economic analysis capability will be explored through the social and economic programs at Memorial University Newfoundland.
- Continue to train department staff and district Planning Team members on factors pertaining to managing forests.

- Financial support for the planning process to be identified.
- One of the challenges in practicing sustainable forest management pertains to the human dimension. The NFS will conduct surveys to improve its understanding of residents attitudes and values pertaining to the forests. As well, the Department will host an annual Provincial Sustainable Forest Management Forum. The forum will take place each year on the Island and in Labrador. This forum will be comprised of provincial stakeholders and will provide advice to the Minister on forestry matters that are provincial in scope.
- Citizens are expressing values that require special attention when managing forest ecosystems. A public survey on SFM conducted by the Western Newfoundland Model Forest in 1999 reported that citizens ranked protection of water, air and soil, variety of animal and plant life and wilderness preservation as the top values; economic wealth and jobs ranked fourth. To address these priority values, management techniques such as landscape design, pre-harvest planning, and additional protection measures in protected water supplies will be applied. The NFS will continue the development and application of landscape design tools and management measures with municipalities.

Element: **Informed decision-making**

Value 6.4 **Informed and responsible decision-making**

Goal 1: Increase awareness and understanding of sustainable forest management.

Goal 2: To establish a research program that improves sustainable forest management decisions.

- Indicators:**
- Proportion of citizens who understand sustainable forest management.
 - Scope, frequency and statistical reliability of forest inventories.

- Availability of forest inventory information to the public.
- Research initiatives undertaken that will improve decision-making.

Actions:

- ▶ The current Provincial Forest Inventory was originally designed for timber planning and operational purposes. However, SFM inventories must be continually expanded beyond timber parameters to incorporate more non-timber value data and be available on a more timely basis.
- ▶ Sustainable forest management includes measurement of indicators. This requires a strong monitoring program, yet the present forest inventory is not designed to monitor change of defined SFM indicators over time. Thus, over the next five years, the new National Forest Inventory program will be added to the existing inventory to enable periodic reporting on the SFM indicators.
- ▶ Public awareness of SFM philosophies has become a key objective of the NFS, which is being created through various initiatives, including influencing school curriculums, open houses, displays and media communications. During National Forestry Week, held each year in May, a Forestry Focus paper is published which highlights forest management in the province. Other ongoing public awareness activities include urban forest tours in Corner Brook, Corner Brook Pulp and Paper woodlands tour, the Thomas Howe Demonstration Forest in Gander and ongoing school and public presentations throughout the province.

The NFS will continue to become more aggressive in its public awareness program through a strategy to be produced by June 30, 2004.

- ▶ To address information gaps associated with managing forest ecosystems, the NFS will establish a committee that will make recommendations to the Newfoundland Forest Research

Advisory Council on where to apply and implement adaptive management programs in addressing these gaps.

Value: 6.5

Compliance

Goal 1: To protect the forest resources for the benefit of the residents of the province.

Indicators:

- Compliance with laws, regulations and the Environmental Protection Plan for Ecosystem-Based Forest Management.
- Amount of forested area that meets a sustainable forest management standard as determined by an independent third party audit.

Actions:

- Report on the number of non-conformance with the provincial laws, regulations and standards.
- A gap analysis was recently completed on the ability of the NFS to achieve the ISO 14001 Environmental Management System Standard. The NFS will use the analysis to direct activities toward meeting the ISO 14001 environmental management system standard on unalienated Crown land.

STRATEGIC DIRECTION 4: LABRADOR

While Labrador represents two-thirds of the provincial land area, occupying 28,800,000 ha less than 10 % of the province's population reside there. As a result, Labrador is comprised of a vast pristine environment with limited access and development to date.

Labrador has a total forested area of 18 million ha, including a total gross volume of over 180

million m³. Forest fires have been the most significant natural ecological disturbance, while flooding from the Upper Churchill River and mining in Labrador West constitute the greatest human disturbances. Small scale commercial harvesting and domestic cutting near communities are the next most prominent disturbances. This disturbance history has led to a forest dominated by either mature black spruce or young regenerating stands of spruce and balsam fir. There are a few areas of intermediate age class, however, they are the exception rather than the rule. The coastal forest in Districts 20 and 21 exhibits a different age class structure where up to three distinct age classes may occur in a single forest stand.

ABORIGINAL PARTICIPATION IN MANAGEMENT PLANNING

Sustainable forest management focuses on balancing all forest values. These values are vital to all stakeholders in Labrador, particularly the aboriginal communities. Historically, aboriginal people have used the land for their subsistence. The land is a source of food, shelter, protection and a provider of spiritual inspiration. In Labrador, this lifestyle has been adopted and embraced by many non-aboriginal residents as well. Consequently, resource development has the potential to significantly impact the lifestyle of aboriginal peoples and Labradorians alike.

Participation by aboriginal communities in sustainable forest management is a critical component required to ensure the protection of unique or significant aboriginal social, cultural or spiritual sites, and areas of forest land available for subsistence purposes. District Planning Teams will develop local indicators to measure the extent to which sustainable forest management incorporates these unique values.

The Planning Team approach to managing the forest ecosystems in Labrador includes participation by aboriginal people, provincial and federal government agencies, industry

representatives, municipalities, the tourism sector, and the general public. Through this mechanism, the values and concerns of all groups are included in how the forests are managed in the region.

MANAGEMENT TOOLS, INFORMATION AND INFRASTRUCTURE REQUIREMENTS

The commercial use of the forest resource for various wood products in Labrador has been relatively cyclic, with varying degrees of economic success. Reasons for this cyclic pattern include inadequate databases for determining forest development patterns and an updated inventory, the lack of adequate infrastructure for access to markets, the inaccessibility and isolation of the wood supply, the amount and distribution of low volume forest stands and integration of other values, and traditional ecological knowledge into management planning. To address these issues, the following actions are proposed for Labrador:

- A research and development program be pursued to address the ecological concerns.
- Full tree harvesting that may affect long term forest productivity will not be used in Labrador.
- Silviculture techniques will be developed to maintain biodiversity.
- Fire zones will be defined.
- Enforcement and monitoring will be expanded.
- Development of geographic information system capabilities.

ECONOMIC OPPORTUNITIES

A priority of this Provincial Strategy for Labrador is to achieve the socio-economic benefits tied to the portion of the AAC which is currently not utilized. Potential economic value is projected at over \$100 million annually and in excess of 1,000 jobs. Increasing demand and price, improved access and transportation systems, plus major technology advances all suggest

that increased harvest and utilization will result in significant economic opportunities for the region.

Initially, it is anticipated that lumber production will be the primary focus in the development of the forest industry in Labrador, with a large sawmilling facility in Goose Bay, medium sized mills in Cartwright, Port Hope Simpson and Postville and other smaller mills throughout the region. Increased focus will be on value-added products manufacturing in Labrador and complete utilization of both primary and secondary products. To accommodate industry development, the region requires improved access. In particular, a bridge across the Churchill River is needed to access forest stands. Improved wharf facilities and storage have been established in Cartwright and other possible other locations in coastal Labrador will be addressed. As well, major new road systems throughout Labrador will have to be put in place.

An expanded forest industry in Labrador can only take place through improved public consultation and stakeholder support, particularly aboriginal and local groups and individuals. This must be coupled with adherence to the principles of sustainability, protection, monitoring and integration of competing forest demands. To ensure these objectives are achieved, the Department of Forest Resources and Agrifoods will remain committed to its planning process which ensures public input through comprehensive consultation and consensus decision- making.

CONCLUSION

Managing the forest ecosystems of the province continues to evolve from an initial period of exploitation, to timber management, to integrated forest management and, today, to sustainable forest management. During this time, aboriginal people have used forests for shelter and subsistence purposes and, likewise, when European settlers arrived, they cleared land and used the forest for lumber to build homes, fishing stages and subsistence requirements. Over time, the management of forests has changed from one of single value use to sustainable forest management involving environmental, economic and social values.

This Provincial Strategy presents the direction for managing the forest ecosystems of the province over the next five years. Embraced is the philosophy of finding a balance between environmental, economic and social values desired by society. The four strategic directions identified in this Strategy give guidance to balancing all forest values. The environmental, economic and social directions incorporate the Canadian Council of Forest Ministers criteria and indicators framework to measure progress towards sustainable forest management. A separate strategic direction for Labrador is presented to address issues unique to that region of the province. A short summary of each strategic direction follows:

1. Ecologically-based forest management:

The foundation for sustainable forest management will be establishing an ecological planning framework. Ecosystem-based guidelines will be developed using existing information. A biodiversity assessment program will continue to be developed.

Biodiversity:

This Strategy will address three biodiversity values; protecting forest ecosystems, special places and wildlife habitat.

Healthy Forests:

Healthy forests will require maintaining the natural ecological processes and productivity of forest ecosystems.

Water and soil:

Essential to ecosystem productivity, aquatic habitat and human survival is the protection of soil and water.

Global impacts:

Work will be initiated to determine the total amount of carbon in the province's forest ecosystems.

2. Economic considerations:

Forest ecosystems will continue to provide many economic benefits to the province. This Provincial Strategy will guide the further development of both timber and non-timber forest products industries.

3. Social considerations:

This Strategy will ensure continued meaningful public participation in forest management planning.

4. Labrador

Aboriginal participation will continue to be supported and forest management tools will be enhanced to enable responsible forest management in Labrador.

All four strategic directions in this Provincial Strategy will require specific directing of

financial and human resources, as well as partnerships with other groups in order to achieve successful implementation. To address the cross-departmental issues, a working group of government departments associated with this Strategy will be established. To ensure continued openness and transparency in managing our forests, the Department of Forest Resources and Agrifoods Forest Policy Committee will guide implementation of this Strategy and an annual report will be produced, which will review progress on its implementation.

Measuring the province's success in achieving sustainable forest management will be through the criteria and indicators defined in this Provincial Strategy. The Department of Forest Resources and Agrifoods will report to the people of Newfoundland and Labrador by December 31, 2004 and again by December 31, 2009.

This Provincial Strategy will lead Newfoundland and Labrador into the 21st century of sustainable forest management. It provides the vision and direction to ensure that present and future generations will enjoy the benefits from our province's valuable forest ecosystems.

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